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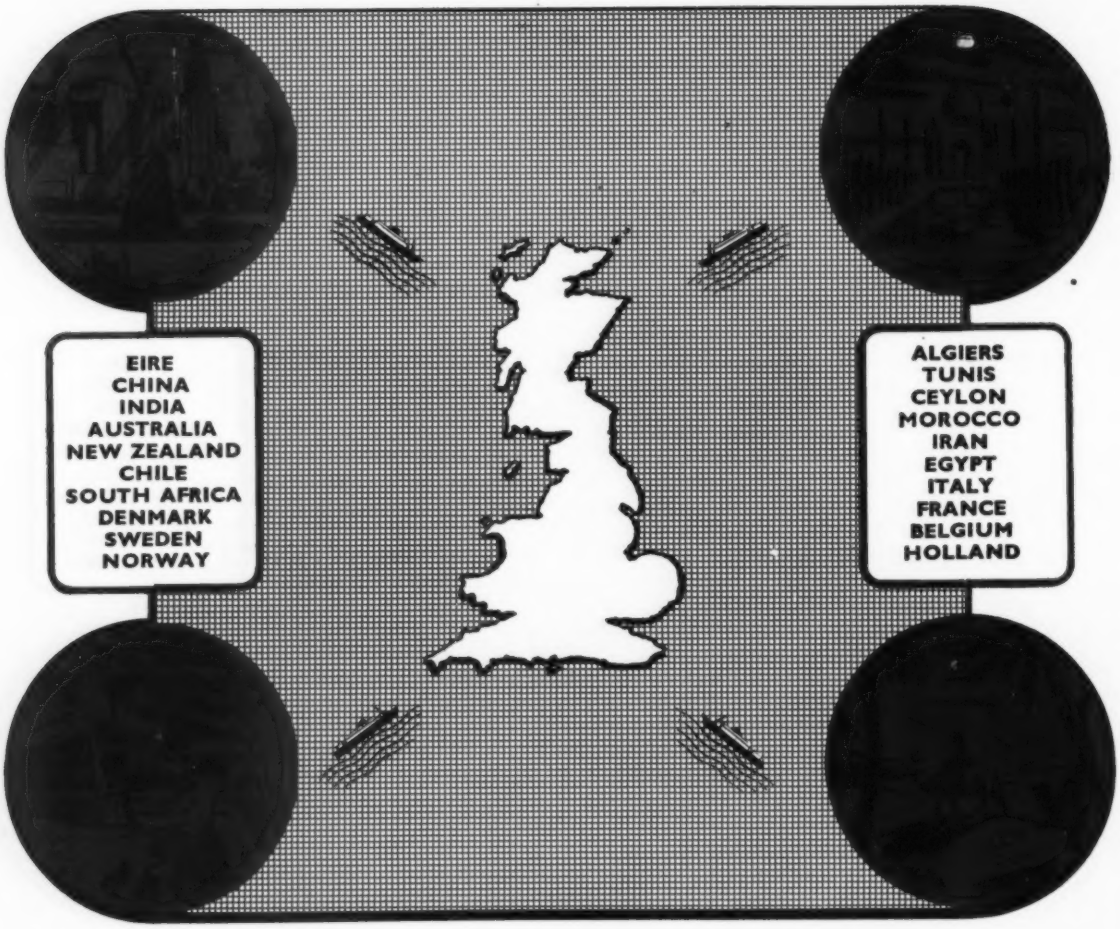

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FOOD MANUFACTURE

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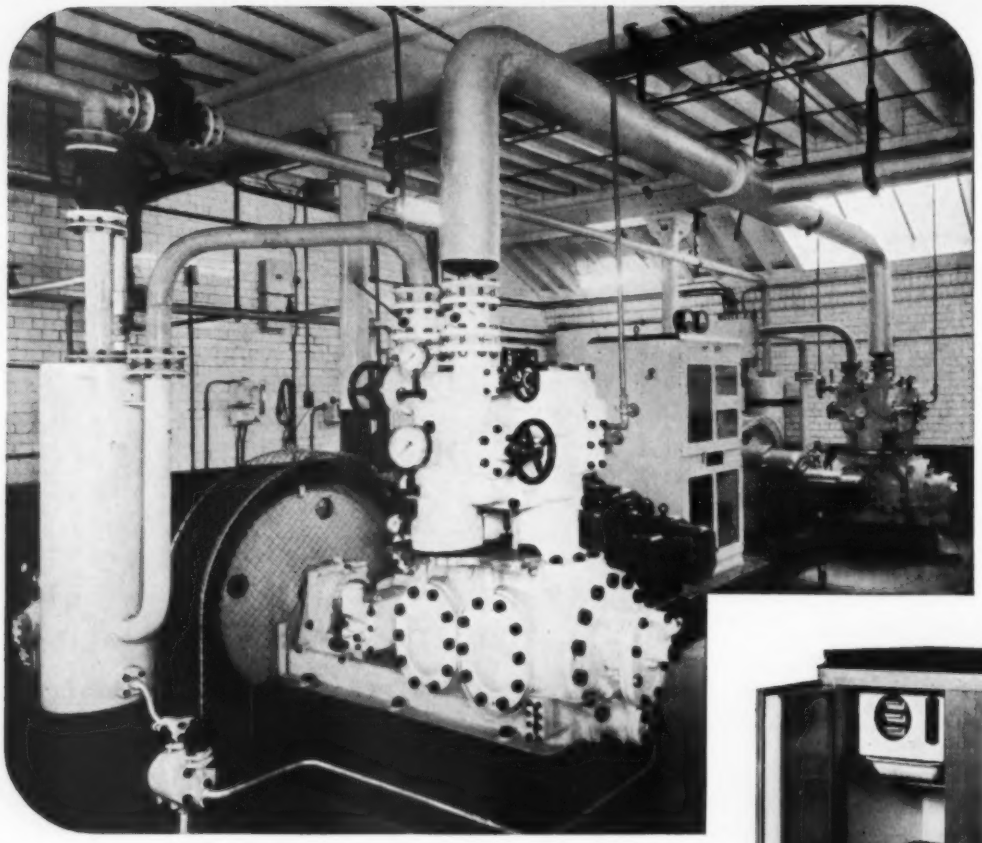

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FOOD MANUFACTURE

Vol. XXV, No. 11 November 1, 1950

The Cider Crisis, 1950

THE sudden onset of cider sickness is well known to most makers. This autumn a sickness no less sudden but economic rather than bacterial in nature has fallen upon the whole industry. The immediate sufferers are not the cider makers but the farmers and fruit growers who produce the apples; nevertheless, long-term effects of the 1950 crisis are bound to be felt by the industry.

The simple fact of the situation is that the cider makers required only a proportion of the 1950 cider apple harvest. Most of the growers had to be content with selling only a part of their crop and this at the relatively low price of £10 per ton, a price that certainly failed to reflect differences between pre-war and post-war growing costs.

A poor market for sellers has sometimes emerged from exceptionally big harvests, but this was not the case in 1950. It is understood that the main cause was that the makers reached the autumn with exceptionally large stocks. French apple juice concentrates had been bought in 1949/50; also, reductions in sugar allocations for cider manufacture had led to some restriction in the output of modern bottled cider.

Estimates of the amount of new juice needed for 1950/51 fermentation, taking account of the concentrates and cider held in stock, forced most manufacturers to the conclusion that only a much smaller tonnage of English cider apples would be required this autumn. A good deal has been done to minimise the amount of hardship to growers. Most factories have made their purchases so that regular suppliers had priority and, where practicable, they have tried to buy a similar proportion of crop from each regular grower. Even so, the growers suffered severely and their plight is a sad paradox.

Nothing that has happened in 1950 alters the long-known fact that many more cider orchards should be planted in Great Britain and that many of the old orchards require substantial tree replacement. For some years the productivity of our cider apple orchards has been declining. The point has been reached when this decline must be checked if the cider industry is to count upon an assured future. Who is now likely to invest capital in new plantations? Who is not likely, after 1950, to revise his plans for renovating existing orchards? What is at present primarily the growers' misfortune will have severe secondary consequences for cider makers in years to come.

It seems extraordinary that so little has been said about the possibility of preserving the unwanted 1950 crop by juice concentration. There is no technical obstacle to this; the practical methods have been studied in this country for years, particularly at Long Ashton. It is tragic that such a large percentage of a specialised fruit crop should be left merely to rot. A letter published in the *Daily Telegraph* has also suggested that the growers should give much more publicity to the regional origin of apples used for British cider. It is certainly disconcerting for cider drinkers to learn that our own apples rot because previous imports of concentrates have, however unexpectedly, lessened the demand.

Basic Training for Food Trade

That boys and girls in the thirteen years age group attending secondary technical schools should be trained in the basic sciences of the food industries was suggested by Mr. J. P. Hallett at the recent meeting of the Liverpool Bakery Trade Advisory Committee.

He stated that between 8 and 10 million people were engaged in the production and distribution of food in Great Britain; he contended, therefore, that basic training should be given to fit children attending secondary technical schools for entry to the food trades, should they wish to do so.

Although the bakery trade could not be singled out for any special consideration, the instruction the boys would receive in scientific subjects such as chemistry and physics would help them in their careers. All teachers complained of the low educational standard of new entrants to the bakery schools. Help given to such students in their last two years at the secondary technical schools, by instruction in the basic sciences, would make for easier introduction to the work at the bakery colleges for the intermediate and final examinations.

Mr. Hallett hoped it would be possible to call together representatives of all the food trades in Liverpool for an exchange of views with the object of approaching the city's higher education authority.

Patent Law Changed

The Patents Act, 1949, makes many alterations in the law of patents. For instance, persons who have purchased a patent may apply as assignees either alone or jointly with another person; before this Act was passed the true or first inventor was required to make the application. The inventor must, however, sign a declaration that he assents to the application being made.

If the inventor has applied for a patent, and then makes an assignment, the assignee can take over the application. When the "complete specification" is delivered in some cases a declaration as to the inventorship may be required to be furnished.

Although the ordinary life of a patent remains sixteen years, new provisions in practice will give a longer period of operation, as the patent now dates from the date of the filing of the "complete specification," which need not be presented until twelve months (in some cases fifteen months) after the application, whereas previously the patent dated from date of application. A "provisional specification" must accompany the application, and if there is a question of priority the date of presenting this will apply. This new dating procedure also means that the increases in the fees which apply as time advances will not apply as early as previously.

Additional grounds for objections to a patent have been introduced by this 1949 Act, and the term "invention" has been amplified, being now "any means of new manufacture and any new method or process of testing applicable to the improvement or control of manufacture and includes an alleged invention."

For a patent to be effective in law, after the grant it must be sealed by the Patent Office, which must be done within the time allowed, this ordinarily being twenty-one months from the date of application for patent (in special cases longer), or the patent lapses. Now, even though the time limits have passed, the Comptroller can order the patent to be sealed, if a request is made within six months after the time allowed and if it is proved that the failure to apply for sealing was unintentional.

British Agriculture Goes Ahead

Some cheering figures have recently been issued by the Ministry of Agriculture and Fisheries with reference to British food production. Compared with its position in 1939, British agriculture is now in a healthy condition; the five-year expansion programme launched in 1947 is half-way towards its completion, both in time and practice. The June returns persistently show a noticeable increase in the numbers of livestock of all kinds, while the production of milk, meat, and eggs is more than keeping pace with that increase.

According to this year's June returns, in England and Wales alone the acreage under wheat is up by nearly half a million, cattle exceed 8 million, having risen by well over 10 per cent. in the past three years, and sheep are now within measurable distance of their numbers before the disastrous winter of 1946-7. The numbers of breeding sows have shown an appreciable increase, and the poultry industry has continued to expand.

The increase in the area under wheat has been, to some extent, at the expense of coarse grains, and this is the really disturbing feature about this year's figures. World supplies are not so plentiful, and our ability to secure supplies is not so great that we can afford to view with equanimity any diminution in the acreage devoted to cereals grown for livestock, particularly for pigs and poultry. Apart from this, it is possible to say with complacency that agriculture is making such steady progress towards the accomplishment of the expansion programme that any further pressure upon the industry to intensify its activities might do more harm than good.

The unsatisfactory harvest over most of the country this year has drawn attention to supplies of feedingstuffs. The total quantity in the ration pool rose from some $2\frac{1}{2}$ million tons to $5\frac{1}{2}$ million tons between 1946/47 and 1949/50. This last figure was made possible by a combination of good harvests and favourable negotiations with foreign countries; but the continued repetition of such circumstances cannot be relied upon, and the only safe policy therefore is greater national self-sufficiency in feedingstuffs.

Cleaning Meat Processing Equipment

The usual ways of cleaning meat processing machinery such as mincers, mixers, cutters, etc., with soap or other detergents tend to cause the particles to stick to the metal surfaces. This can be partially avoided by washing the equipment with cold water, followed with hot water and detergent.

A new method of cleansing which has been worked out in the Department of Biochemistry of the University of Minnesota involves the use of pancreatic enzymes, which attack both the protein and fat of the meat.

The dismantled equipment is immersed in a dilute aqueous solution of the enzyme preparation, and after a short treatment the adhering meat particles will have been digested and the equipment will merely need rinsing with hot water.

The enzyme preparation is most active at *p*H 9 and 98° F., and a buffer consisting of a mixture of 53·5 g. of ammonium chloride and 67·5 ml. of ammonium hydroxide (28 per cent. NH_3) is used in the proportion of 10 ml. to the gallon of the solution of enzyme.

Processing Foods with Ascorbic Acid

In addition to its role in animal and plant nutrition, the chemical properties of crystalline *l*-ascorbic acid have been useful in retarding colour and flavour changes in food products caused by oxidative or enzyme-catalysed oxidative processes.

Jacob C. Baüernfeind, in a paper presented to the Division of Agriculture and Food Chemistry of the American Chemical Society, described how the discoloration of cut or frozen fruit caused by the action of enzymes and oxygen can be retarded by the addition of ascorbic acid.

In addition to uniting with the oxygen of the air, ascorbic acid can serve as a primary substrate or is indirectly involved in the activity of ascorbase, peroxidase, and the polyphenolase. The ascorbic acid treatment of certain frozen cut fruit is an accepted process in commercial freezing.

The development of rancidity in frozen fish and that of oxidative off-flavour in milk and other dairy products can be retarded by added ascorbic acid. While treatment with small quantities of ascorbic acid is not a panacea for all discolorations and deteriorative changes in food products, it is a method by which such changes can be delayed.

Eliminating Vegetable Wastage

The frequent complaints of growers who plough in their vegetable crops because their produce cannot be sold to markets even at "give away" prices, raise a question in the public mind. If such things do happen, why do retail prices of vegetables remain so high?

There is more than one answer to this question and Mr. H. Boyd, A.M.Inst.R., M.Inst.M., has recently given some of them (*M.O.F. Bulletin*, No. 560). Retailers' overhead charges remain constant and at the same high level and great losses are involved in retail distribution through wastage and shrinkage. Basically, therefore, it is a question of regulating supplies of vegetables between grocer, wholesaler, and retailer and, at the same time, retaining the immediate surplus in a fresh condition.

He also suggests a solution to the problem of temporary gluts. Cold storage is impracticable because the available cold storage space is insufficient and is not always located where it is most required and even if vegetables are put into cold storage, they still suffer loss from "cooler shrinkage."

The great disadvantage, however, is that in both instances the vegetables lose a substantial proportion of their vitamin content which, from the nutritional point of view, is of paramount importance. Spraying the vegetables with water, as is commonly practised, revives them momentarily but does not restore the lost vitamins. On the other hand, a combination of cool atmosphere and moisture of a relative temperature not only keeps the vegetables fresh, but maintains the rich vitamin content.

Crushed ice provides both conditions. Experiments in the United States during the past few years have made rapid progress in the elimination of wastage and shrinkage by its use. More important still, technical data collected as a result of these experiments show that vegetables packed in ice retain their freshness and their ascorbic acid and carotene values.

Recent British tests have proved that vegetables and salads when packed in crushed ice keep in first class condition for a period of three weeks, without any loss of weight. The exceptions are tomatoes and cucumbers, which are normally stored at temperatures of 50° F. and 40° F. respectively.

Growers and distributors of fresh vegetables would be well advised to investigate the possibilities of preserving their produce by this method.

Ice is obtainable throughout the country at reasonable prices and the expenditure involved would show an ultimate saving which would amply reward progressive effort.

DDT Residues and Flour

The atomic bomb and DDT will be regarded by many as the two most notable scientific developments of the war. They have now been brought together in a more direct and scientific sense by recent British research carried out by the Pest Infestation Laboratory. Radioactive isotopes, produced at the Harwell atomic pile, have been used to study the biological movements of DDT residues upon wheat.

In point of fact, DDT itself was not used. The radioactive isotope of bromine was more suitable than that of chlorine, and an insecticide containing one bromine atom in the place of one of the chlorine atoms in DDT was prepared. This particular chemical was known, however, to have properties closely similar to those of DDT. Wheat grain was sprayed with the "radioactive" insecticide. When fed to hens, it was found that the insecticide had reached many of the hens' organs and tissues within a few days; autopsies five days after feeding showed the insecticide in the gizzard, the liver and kidney, the tissues of the heart and brain, and the sciatic nerve fibre.

When the wheat was milled, about one-third of the residues was found in the flour, thus showing that the insecticide had quickly penetrated the grain husks. Not only were residues also found in bread made from this flour, but there was an indication of some chemical association with wheat protein as a result of the bread baking conditions. Rats fed with the bread, like the hens fed with the unmilled grain,

showed wide and rapid distribution of the insecticide in their bodies. Indeed, in all these animal tests, some concentration of the insecticide was found in every tissue examined.

These new results give strong confirmation for the view that DDT is a hazardous contaminant of animal and human foodstuffs. Though in themselves the residues from DDT applications may be small, it is clear that they are considerably retained after ingestion. Toxic effects of a harmful if not lethal nature could arise from the cumulative absorption of DDT residues.

Too little remains known about the chemistry of DDT within the metabolism of animal life. Fortunately, the use of DDT as a contact insecticide for protecting stored grain has not been encouraged; volatile fumigants have been preferred. The new research emphasises the wisdom of this policy. It also suggests that DDT should never be used to dust or spray growing cereal crops.

Duck Eggs Again

Deaths from Salmonella poisoning as a result of eating ducks' eggs continue to be reported. For those who like to eat their duck eggs boiled, a study of the experiments carried out by A. Clarenburg and H. C. Burger on the survival of *Salmonellae* is recommended (*Food Research*, **15**, 4, 1950).

The eggs used in the experiment were infected by injecting into the yolk cultures containing approximately 100,000,000 *Salmonella typhi murium* and *Salmonella enteritidis* organisms isolated from naturally infected ducks' eggs. The eggs were kept in an ice-water bath at 32° F. for at least one hour in order to cool the centre to the same temperature. They were then immersed in boiling water for varying times.

The results showed that a boiling time of ten, eleven, or twelve minutes was insufficient to kill all *Salmonellae*. Even after thirteen minutes, viable bacilli were still present in big eggs (diameter 47 and 48 mm.). After fourteen minutes' boiling, however, all bacilli were killed, even in the biggest and heaviest eggs on the market.

The temperature inside the eggs was measured by means of a thermocouple, consisting of thin constantan and steel wires. One point of contact, the end of a steel needle, was placed in the centre of the egg, the other kept at a fixed, known temperature. The experiments showed that after ten minutes' boiling the temperature at the centre was still under 122° F., and that there was a rise in temperature of the centre when the egg was kept in boiling water thirty minutes.

Considering these results, it is not surprising that live *Salmonellae* are still present in 46 mm. eggs boiled for eleven minutes. They are killed when the centre of the egg has reached a temperature of 138° to 140° F.

From a practical point of view, it is important that the temperature of the centre continues to rise after the boiling process, when the egg is cooled in the air or in cold water. If ten minutes' boiling is followed by immersion in water of 32° F., the central temperature still rises enough to kill the *Salmonellae*. Thus, strictly speaking, the destruction of the bacilli is caused in this case by the rise in temperature after the "boiling" and during the "cooling." If, however, the egg is eaten at once after ten minutes' boiling, or its contents cooled down immediately by slicing or chopping, viable *Salmonellae* may be present and constitute a health hazard.

Reel—Not Fling

It was at the Food Group conversazione that we encountered an eminent Scottish member of the Oslo tour. It appeared that as far as Scotland was concerned we figured on the *Index Expurgatorius*. In a recent article we had been guilty of misnaming a charming dance performed by some members after the farewell dinner to the Group at Bergen.

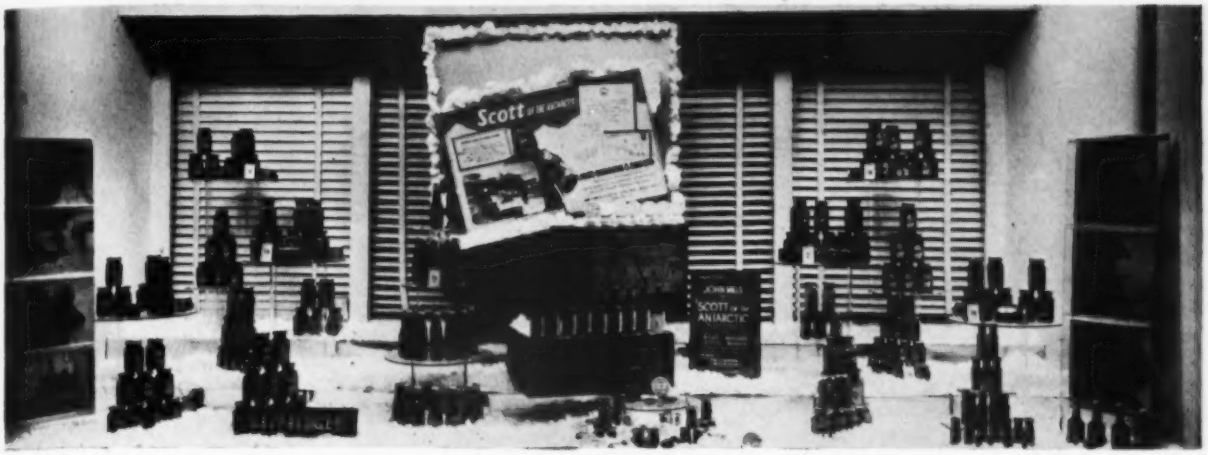
"It was a reel and not a fling," said our fellow member, severely.

Something had to be done about this, so, with much burning of the midnight oil, we belatedly consulted the literature. We gathered that "the Highland Fling . . . symbolises victory and rejoicing. With other dances of Scotland, it has been highly formalised. Moreover, its routine, steps, and the proper execution of each are so clearly defined and generally understood that any change in them is immediately resented by the audience."

At this stage of our investigations, we realised that we were up against a serious subject. Continuing (our authority being T. and M. S. Kinney's *The Dance*), we read that "the Reel has a good deal in common with the Fling, and is of the same general character. In Scotland and Ireland it is customarily performed by two couples. Its distinguishing feature is a figure eight, traced by a little promenade, each of the performers winding in and out between the other three. Even this promenade is performed in a sharp skipping step so that the dance will lose none of its national flavour."

The Encyclopaedia Britannica is more terse. "The Fling and the Reel are complicated measures of a studied classical order, in which free use is made of the arms and of cries and stampings."

We record the foregoing as we should hate to think that by misleading them, our Sassenach colleagues might go through life not knowing the difference between the Fling and the Reel!



The products of John Burgess and Son, Ltd., were displayed by Selfridges in connexion with the film "Scott of the Antarctic."

1760–The House of Burgess–1950

It was in 1760, when George III succeeded to the throne, that William Burgess, a country grocer, sent his son John to London to enter the trade of "Oilman and Italian Warehouseman," the equivalent of our present-day delicatessen shop. Fine quality goods were imported from abroad: salad oils, truffles, olives, and the best Italian anchovies from Gorgona, along with many other items to tickle the discerning palate. Now, in 1950, with premises and machinery restored and modernised, it is the traditional goodness of Burgess's products—in many cases still essentially similar to their products of the 18th century—which justifies belief in a future for the House of Burgess as distinguished as its past.

JOHN BURGESS'S establishment in the Strand quickly gained him considerable repute, and soon he had to seek larger premises. In the *Morning Post* of May 7, 1779, he advised "the Nobility and Gentry" that he was moving from No. 101, The Strand, to No. 107. He was a firm believer in the power of advertising, and did not miss an opportunity for an insertion in the first issue of *The Times*.

Not content to rest on his laurels, John Burgess invented many of his own table delicacies, most famous of which was his "Original and Superior Essence of Anchovy." Famous authors held Burgess's savoury preparations in much esteem, and in "Beppo" we have Lord Byron meditating on the trials of fasting for Lent, and exhorting his readers to "walk or ride to the Strand" to purchase suitable sauces to enhance their fish diet! Likewise, Sir Walter Scott, in chapter xxx of *St. Ronan's Well*, has written: "'Never mind, never mind, I shall make no bad use of what I have learned,' said Touchwood. 'Were you to eat your words with the best fish sauce (and that is Burgess's), I have got all the information from them I wanted!'"

Mr. F. C. Matthews, F.G.I., M.I.I.A., general manager.

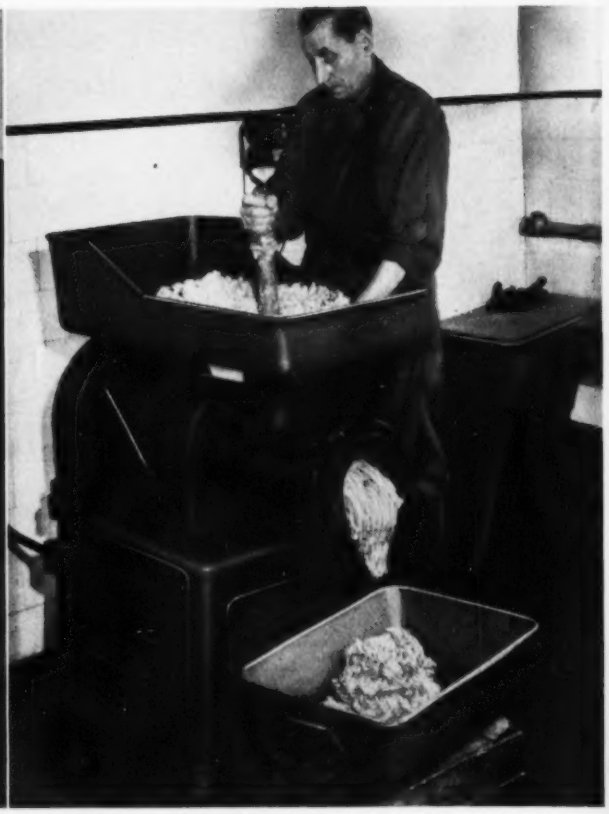
The interests of John Burgess and Son were soon extending to every corner of the globe, but it was from the busy fleet of Gorgona fishing boats, off Leghorn, that the chief production of the business still derived when, in 1853, Her Majesty Queen Victoria awarded the Royal Warrant to the House of Burgess.

Burgess's Anchovy Products were among the stores taken by Captain Scott on his Antarctic expedition, and it was undoubtedly the quality and flavour of these which earned for the firm the Royal Warrant of appointment as purveyors to King George V.

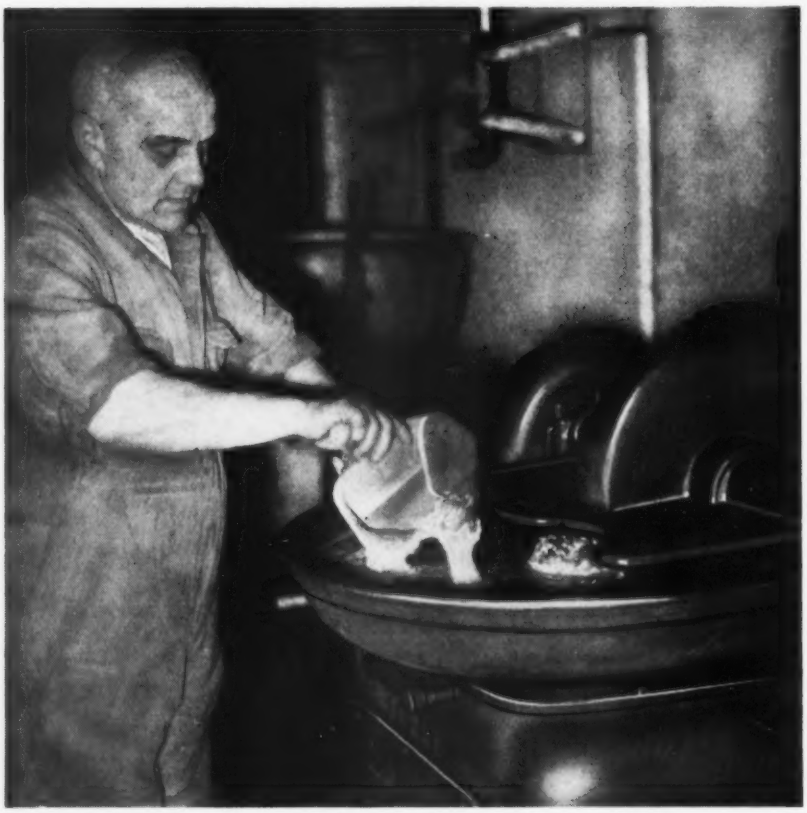
During the Second World War, in September, 1940, and again in May, 1941, the Burgess premises were severely damaged by enemy action, but production was continued on a small scale, and not one regular customer was refused a fair allocation.

The firm's present products cover a wide range. In addition to the famous anchovy specialities (genuine anchovy paste, anchovies in olive oil or brine, and essence of anchovies) and many varieties of pickles and fish pastes, the company now markets cocktail specialities, sardine and tomato, salmon, and salmon and cucumber spreads, tomato and

Boiling is the first operation in fish paste manufacture, a steam-jacketed pan being used for carrying this out.



A power-driven mincing machine is used for the conversion of cooked fish, spices, etc., to paste.



The bowl chopping machine containing the mixture revolves into the choppers at the rear of the machine.

mango relish with a unique flavour, capers, chutney, olive oil, gravy browning, sauces, and rennet.

One of the most interesting features of present-day production is the manufacture of fish paste. The fish is received in the factory kitchen and boiled in steam-jacketed pans. After boiling, surplus water is drained off and other ingredients such as spices, cereal, and fats are added to the prepared fish.

The mixture is then passed through a power-driven mincing machine for conversion into paste. In order that the paste should be homogeneous, it is next placed in the bowl chopping machine which has revolving knives. Treatment in this machine for fifteen minutes ensures a thorough mixing of all the constituents.

The paste is then transferred to an air compressor filling unit. By the use of this equipment, the paste is forced along the ejector nozzle of the filler directly into the jars, this being a high-speed operation.

The filled jars are placed on a

A close-up of the exposed chopping knives in the bowl chopping machine. Treatment in this machine for fifteen minutes ensures thorough mixing of all the constituents.

In the power filling machine, the paste is poured into a container and forced through a tube under pressure, the empty jar being held over the end of the tube for filling. The operator fills the jar and controls the flow of paste with the lever in her right hand. After this, the jars are placed on a conveyor belt.

The filled jars pass along the conveyor belt for the application of parchment circles and metal caps. The well-known locking ring and cap are already assembled and are simply placed on the jar.

Above left: **The capping machine operator seals the caps to the jar.**

Above right: **The sealed jars are stacked on a trolley for retorting.**

Below left: **After sterilising and cooling, the jars are placed singly into the pockets of the lift conveyor which takes them to the floor above.**

conveyor belt travelling through to the capping department, where parchment circles are placed on the surface of the paste and the jars are covered with Phoenix caps. Continuing on their way, the jars reach the capping machine in which each cap is sealed.

The sealed jars are placed in wire trays and carried to the sterilising department where they are placed into retorts and processed for one hour at 235° F. After cooling, the jars of paste are removed and carried by lift conveyor to the labelling department on the floor above.

From the labelling machine the jars are carried along by belt conveyor on the final stage of their journey through the factory to a department where cap labels are

affixed and the finished product is packed into cartons ready for despatch.

Many varieties of potted fish paste are prepared, including bloater, crab, crab and anchovy, herring and tomato, lobster, pilchard and tomato, salmon and anchovy, salmon and shrimp, salmon and tomato, sardine and anchovy, and smoked herring and tomato.

In addition to the standard size pots, a new midget pot has been introduced to assist housewives in securing a wide range of pastes at an economical price.

At the reception end of the lift conveyor, the operator labels the jars, which are then placed on another conveyor belt.

Pickle Production

The resources of many parts of the world are drawn upon for the manufacture of pickles. Although a percentage of English cauliflowers and cucumbers is used when in season, quantities of brined vegetables come from Holland.

The brined vegetables are handled in the vegetable preparation section, where the brine is drained off and the vegetables treated with a vinegar solution and left to steep for a few days. They are then cooked in the kitchen on the ground floor, after which the usual processes of filling, capping, and labelling are carried out.

Products bottled in this department include clear mixed pickle, gherkins, onions in brown vinegar, small white onions in white vinegar, piccalilli, Poona relish, red cabbage, and sweet pickle.

In the anchovy bottling department, a team of women is engaged on filleting, hand-rolling, and curling the fish prior to bottling. Curled fillets in pure olive oil and whole fish in brine are the two chief products of this department.

In the cap labelling and packing department, the jars of paste are packed into small cartons prior to despatch.

SUPPLIERS OF EQUIPMENT

Bottles and jars: *National Glass Works; United Glass Bottle Co.; J. W. Sutcliffe; Key Glassworks; Davey and Moore.*
Caps: *The Pontnewydd Tin Stamping Co.; The Metal Box Co.; Roberts Capsule Stopper Co.; Metal Closures.*
Cartons: *Willmer and Co.; A. E. Mallandain; S. and S. Goolnik; The Alliance Box Co.*
Chutes and roller conveyors: *Lamson Engineering Works.*
Weighing machines: *Young, Son and Marlow.*
Capping machines: *Hammond, Smaldon and Co.*
Labelling machines: *Rawsons (Labelling Machines); Purdy's Patent Machinery Co.*
Labels: *Sanderson and Clayton; Alfred Cook.*
Jacketed pans: *C. Sherman and Sons.*
Storage vats: *Carty and Son.*
Mincing machines and bowl chopper: *J. C. Wetter and Co.*
Vinegars: *British Vinegars.*

Ministry of Food

LATEST STATUTORY INSTRUMENTS

The list given below is the continuation of the list of Instruments published in "Food Manufacture," October 1, 1950, page 404.

No.	*Date 1950*	
		PRICE FIXATION
1429	Aug. 22.	Order amending the Butter (Control and Maximum Prices) Order, 1947.
1431	Sept. 12.	Order amending the Coffee (Maximum Retail Prices) Order, 1946. Revokes S.I. 1950, No. 617.
1433	,, 1.	Order amending the Milk (Control and Maximum Prices) (Great Britain) Order, 1947.
1460	,, 10.	Order amending the Bacon (Control and Prices) Order, 1950.
1488	,, 10.	Order amending the Chocolate, Sugar Confectionery, and Cocoa Products Order, 1949. Revokes S.I. 1950, No. 766.
1541	Oct. 1.	Order amending the Feedingstuffs (Prices) Order, 1950.
		COLD STORAGE
1422	Aug. 26.	The Cold Storage (Control of Undertakings) (Charges) (No. 2) Order, (Amendment) Order, 1950.
		EGGS
1418	Aug. 24.	Order amending the Eggs (Great Britain) Order, 1949, and the Eggs (Northern Ireland) Order, 1949.
1547	Sept. 21.	Order amending the Eggs (Great Britain) Order, 1949, and the Eggs (Northern Ireland) Order, 1949. Revokes S.I. 1950, No. 1418.
		FEEDINGSTUFFS
1540	Oct. 1.	Order amending the Feedingstuffs (Manufacture) Order, 1949.
1542	,, 1.	Order amending the Feedingstuffs (Rationing) Order, 1949.
1543	,, 1.	Order revoking the Pigeon Feedingstuffs (Returns) Order, 1941.
		LABELLING
1061	Nov. 1.	The Labelling of Food Order, 1950. Revokes S.R. and O. 1946, No. 2169; 1947, Nos. 757, 2001, and 2709; S.I. 1948, No. 2598; 1949, Nos. 1161 and 1536.
		MEAT
1534	Sept. 17.	Order amending the Meat (Rationing) Order, 1950.
		MILK
1456	Sept. 1.	The Milk (Great Britain) (General Licence No. 3) Order, 1950.
1457	,, 1.	The Use of Milk (Suspension of Restriction) (No. 2) Order, 1950. Revokes S.I. 1950, Nos. 555, 1064, and 1235.
		POTATOES
1237	Oct. 4.	The Ware Potatoes Order, 1950. Revokes S.I. 1948, No. 2199, and 1950, No. 930, and S.I. 1949, No. 1818, and 1950, No. 928.
		POULTRY
1046	July 1.	Order revoking the Poultry (Control and Maximum Prices) Order, 1947, and the Poultry (Control and Maximum Prices) (Northern Ireland) Order, 1947.
		PRESERVES
1056	Sept. 25.	The Food Standards (Preserves) (Amendment) Order, 1950.
		RATIONING
976	June 18.	Order amending the Bacon (Rationing) Order, 1950.
978	,, 18.	Order amending the Sugar (Rationing) Order, 1950.
1071	July 2.	Order amending the Fats, Cheese, and Tea (Rationing) Order, 1950.
1137	,, 16.	Order amending the Sugar (Rationing) Order, 1950.
1353	Aug. 13.	Order amending the Sugar (Rationing) Order, 1950.
1432	,, 27.	Order amending the Meat (Rationing) Order, 1950.
1482	Sept. 10.	Order amending the Fats, Cheese, and Tea (Rationing) Order, 1950.
1625	Oct. 8.	Order amending the Bacon (Rationing) Order, 1950.
		RICE
1617	Oct. 8.	The Rice Order, 1950. Revokes S.R. & O. 1945, No. 1505 and S.I. 1948, No. 1748.
		SHIPS' STORES
1462	Sept. 10.	The Ships' Stores (No. 2) Order, 1950. Revokes S.I. 1950, Nos. 128 and 1134.
		SOAP
1194	Aug. 13.	The Soap (Licensing of Manufacturers and Rationing) (General Licence) Order, 1950.
		SUGAR CONFECTIONERY
1430	Aug. 27.	Order amending the Chocolate, Sugar Confectionery, and Cocoa Products Order, 1949.

Progress in Dairy Chemistry

J. G. DAVIS, D.Sc., Ph.D., F.R.I.C.

Part I

In this survey of the literature, the author has collated data on recent developments in dairy chemistry and discusses advances in research covering a wide range of dairy products.

ALMOST useful and up-to-date review of milk utilisation has been given by Capstick;[1] problems of quality payment are discussed by Weldon[2] and Davis.[3] General trends and developments in the industry have been described by Newton,[4] and Jenkins[5] has considered condensing and other forms of manufacture. Wilcox[6] has discussed the measurement of milk by weight, always a thorny problem. Current trends in marketing have been reviewed by Davies and Bigmore[7] and in the composition of milk by Rowland.[8] He states that fat and solids-not-fat have steadily fallen over the last twenty years, and that since 1941 solids-not-fat have been specially low in late winter.

Lythgoe[9] has published a summary of methods used for estimating fat in milk, and Twomey[10] gives a survey of the New Zealand milk industry. Bakalor[11] has published an extensive study of the fat and solids-not-fat contents of S. African milk and the factors influencing them.

The annual *Dairy Produce* (H.M.S.O.) gives a very comprehensive account of the production, trade, and consumption of dairy products in the Commonwealth and in other countries.

British Standards (Nos. 1416 and 1417, 1948) have been published for the sampling and analysis of acid and rennet caseins (moisture, ash, fat, *p*H, iron, nitrogen, and lactose). Texte[12] has discussed various methods of packaging for butter and cheese, and given the reasons for his preferences.

Analytical Methods

A number of papers have been published on general analytical methods of interest to dairy chemists. The 1948 edition of Standard Methods for the Examination of Dairy Products, N.Y., will be of great interest, mainly for purposes of comparison, as American methods are so frequently different from ours.

Munchberg[13] has written a review of micro and semi-micro methods for milk.

Dutch workers have published a series of papers on methods for estimating fat in milk and milk products,[14] and Hortettler and Hanni[15] have compared modifications of the Gerber and Röse-Gottlieb methods for fat. Hortettler *et al.*[16] have proposed a mercurimetric titration method for chloride in dairy products.

Horwitz and Knudsen[17] have compared methods for sampling for fat and moisture determination of different types of cheese. Meuron[18] also reports on the preparation of butter samples. Munsey,[19] in examining bread for milk fat and solids, steam distils the volatile acids and separates them on a silicic acid column. Fat from milk bread yields about 15 mg. butyric acid per g.

Coleman *et al.*[20] have developed a spectrophotometric estimation of copper as the dithizone in 50 g. of fat with special ashing methods. For an accuracy of ±0·04 p.p.m., estimations in triplicate are necessary.

Bouw[21] concludes that the diphenylcarbazide method is best for detecting bichromate in milk.

Duggan describes a method for determining free tryptophane in milk, cream, and butter,[22] and de Vleeschauwer and Heyndrickx[23] give the following factors for the formaldehyde titration of milk proteins: 0·45 for albumen, 0·357 for casein, and 0·428 for total proteins (ml. $\frac{N}{4}$ NaOH per 100 ml. milk). Borrell[24] gives procedures for determining the nitrogen distribution in milk.

Claborn and Patterson[24] have published detailed methods for identifying and determining lactic and succinic acids in foods.

Mandel and Bieth[25] report that cows' milk contains about 16 mg. per litre of ribonucleic acid phosphorus.

Physical Aspects

Eilers[26] has published a monograph on the colloid chemistry of skim milk which brings forward some very useful data on milk proteins, viscosity, and the stability of condensed (sweetened) and evaporated (unsweetened) milk. Not all chemists will agree with Eilers's conclusions, but this publication is of great value not only because of the new contributions to knowledge, but also because of the useful review of the literature and the analytical data. In the same book Saal and Heukelom describe their studies on the oxidation-reduction potentials in milk, butter, and milk powder. They conclude that oxygen, ascorbic acid, and perhaps lactoflavin determine the Eh of raw milk. Heating milk results in the formation of a reducing system $E_o + 0{\cdot}05$ v. Crow *et al.*[27] conclude that this system (or part of it) originates from lactose, and describe a modified ferricyanide method for estimating the reducing capacity of milk.

Roine[28] has confirmed the stabilising effect of a low Eh produced by bacterial cultures on ascorbic acid. The rate of oxidation was not significantly affected by *p*H over the range 4 to 7. Fermented milks were able to reduce a large part of added dehydroascorbic acid.

Macdonald[29] has made a most useful contribution to our knowledge of the freezing point of bulk milk. He finds an average value of −0·544° C.

Rangappa[30] finds that albumen and globulin affect the refractive

index of milk more than does casein. The relationship between lactose and n is not linear. He further reports[31] that skimming lowers and narrows the range of n for both cow and buffalo milks. It is impossible to differentiate the two skim milks by this means.

Mitchel and Frary[32] conclude that refractometric methods cannot detect less than 5 per cent. added water in milk if the present A.O.A.C. criteria be used, and suggest that the lower limits for refractometric reading and serum ash be raised. The authors condemn the "sour-serum" method and recommend the copper method. They approve the cryoscopic method as being rapid, accurate, and most reliable.

Colour of Milk

The colour of milk has been studied by Nelson[33] using a Beckman spectrophotometer. The reflectance of light at 520$m\mu$ has been used to measure the colour of evaporated milk. Jenness and Coulter[34] have separated the fluorescent substances in milk by 67 per cent. acetone (chiefly riboflavin), 20 : 80 acetone - ether (lipids), and 10 per cent. potassium chloride (proteins). Roeder[35] claims that pH values obtained by the "Frigidol" colorimetric test are accurate to about $\pm 0{\cdot}05$ pH, and Jackson[36] has made a useful contribution to the difficult problem of temperature corrections when using the glass electrode. Loftus Hills[37] has studied the effect of sodium chloride on the pH of milk and butter serum. Addition of 10 per cent. causes an average fall of 0·42 pH. Virtanen[38] has discussed the importance of pH control for the preservation of various types of foodstuffs.

Clotting and Foaming of Milk

Feigenbaum[39] has reviewed the enzymic effects in the clotting of milk, and Spur,[40] in his studies of the curd tension of homogenised milk, suggests that a soft curd milk be defined as one with a curd tension of 15 g. or less.

Richardson and El Rafey[41] have continued their studies on the foaming of milk. This is at a minimum at 30°-35° C. Two types are recognised, one due to phospholipid-proteins and one due to proteins, the latter predominating at higher temperatures. At 60° C. the foam volume is independent of the fat content.

Humphriss[42] has devised a form of lactometer jar which gives a more accurate reading and ease in use, and Martin[43] has also described a densimeter cylinder for routine milk testing.

Oser[44] has written a very informative review of advances in analytical chemistry in relation to foods for the past year.

Proteins in Milk

Eilers *et al.*[26] give a useful summary of data about casein and the other proteins in milk.

Smith[45] has reviewed the immune proteins in milk and colostrum. In colostrum as much as 25 per cent. of the protein may be in the aqueous phase. Parrish *et al.*[46] have continued their studies on colostrum and factors affecting its nitrogen distribution. Lea[47] has been able to obtain good reproducibility with the van Slyke method for the proteins in milk powder. He found a value of 54 mg. free amino N per g. total N. Of this the ϵ-amino groups of lysine accounted for about 93 per cent., and he has suggested that the method can be used to follow the deterioration of stored milk powder. Lea[48] has further shown that discoloration of milk powder is associated with the linking of the free amino-groups of the proteins with reducing sugars. Glucose reacted more rapidly and produced more coloured and insoluble complexes than did lactose. Sucrose exerted a restraining effect.

Neseni and Körprich[49] find that the residual nitrogen in milk varies between 13 and 40 mg. per cent. and is higher at the beginning and end of lactation.

Thompson *et al.*[50] have shown that a brown substance is formed when casein, etc., reacts with ascorbic acid, etc., in the presence of copper. A fragrant odour is associated with the reaction.

Braude[51] has reviewed the value of microbiological proteins as food for animals, especially in relation to milk production.

Fat Studies

Mummery[52] has described a modified Schibsted fat aldehyde test and Schmalfuss[53] has discussed the value of acidity, peroxide value, free aldehydes, epihydrinaldehyde, and ketone contents as tests for fat deterioration (taint).

Olonfa and Jones[54] failed to find any correlation between month of calving and butterfat production.

Cox and McDowall,[55] in a four-year study of factory butter, report average values as follows: iodine 36·7, Reichert 30·4, saponification 229·5, and softening point 33·1° C.

Anantakrishnan *et al.*[56] have found that cottonseed, sesame, and hydrogenated peanut oil, but not hydrogenated coconut oil, in the diet of cows produced increases in the iodine number and a decrease in the Polenske value of the butterfat.

Konkovsy *et al.*[57] have studied the stability of fat and fat-soluble vitamins in butter, etc., by a re-emulsification test. The chief factors appear to be vitamin C, treatment of the milk, temperature of pasteurisation, conditions of storage, and, to a less extent, exposure to light.

Smith[58] has discussed existing knowledge of the nutritive value of butterfat, margarine, and other fats.

Arup[59] has reviewed the technical development of margarine manufacture. Keeping quality has been improved by the use of water instead of milk for emulsification, and artificial addition of vitamins can result in margarine being richer in these than winter butter.

Funck[60] has compiled a very interesting historical review of the applications of whey and lactose in the Middle Ages.

Sadhu[61] has demonstrated a high correlation between brain cerebrosides and milk lactose contents, and a slight correlation between brain choline and milk lactose.

Vitamins in Milk

Hochberg[62] has described an improved method which gives theoretical values for added vitamin A in milk. Squibb *et al.*[63]

have applied the new activated glycerol dichlorhydrin reagent to the determination of this vitamin in milk in a study of the effect of feeding raw soya beans. Esh *et al.*[64] have studied the effect of feeding phosphatides on the absorption of vitamin A, and Hibbs and Pounden the effects of ration and rumen development.[65]

Sarkar[66] gives values for vitamin A and other constituents in the milk of Hariana cows, and in colostrum.[67] Barnicoat[68] has studied the vitamin A and carotene values for New Zealand butter, and Augulo *et al.*[69] give similar values for the milk of Cuban cows. Boisselot and Canseret[70] have found that vitamin A in milk is not destroyed by irradiation. Gullickson *et al.*[71] report that feeding tocopherols had no effect on the amount or fat content of the milk.

Holmes and Jones[72] have found a 7 per cent. per day loss for vitamin C added to milk. Chu[73] has written an up-to-date account of the chemistry and importance of biotin.

Using the Bourguin-Sherman diet, Corner and Schuck[74] have obtained higher values for riboflavin in evaporated milk than by using microbiological or fluorometric methods. They failed to find any loss of riboflavin due to evaporation.

Inorganic Constituents

McDowell[75] has described improved methods for estimating iron and copper in butter and cream, and Johnston *et al.*[76] have confirmed a value of about 0·3 mg./kg. for iron in milk.

Pyenson and Tracy[77] have pointed out that the significant amount of iron and copper in stabilisers, cocoas, etc., may hasten the onset of oxidised flavours in ice cream.

A valuable series of papers on the effect of metals on milk and milk handling has appeared.[78] Bryan[79] has reviewed the importance of aluminium and its alloys in relation to dairy products and other foods.

Allport and Garratt[80] have reviewed critically available methods for estimating metallic contaminants in foodstuffs, and Monier-Williams[81] has discussed their toxic effects. Forstner[82] has written on the same subject from the technical aspect and gives some very useful figures for various foodstuffs.

Cuthbertson[83] has reviewed the problems of trace elements in human nutrition.

Enzymes in Dairy Technology

Hetrick and Tracy[84] have found a semi-log relationship between time and temperature in their study of the effect of H.T.S.T. pasteurisation on lipolysis in homogenised milk. At 145° F. lipase was destroyed three times as quickly as phosphatase, but at 185° F. both enzymes were equally rapidly destroyed. Schwarz and Fischer[85] have modified the Scharer phosphatase test and claim certain advantages for the new method. Andersen[86] also describes a modification of the Scharer test using a $NaHCO_3$–Na_2CO_3 buffer and dibromoquinonechlorimide. Stiven[87] has utilised the liberation of phenolphthalein from its phosphoric ester as the basis of a simple phosphatase test for milk. It is claimed that certain well-known disadvantages of the official phosphatase test are avoided and it is put forward as a "screening test."

Clegg and Lomax[88] have studied the phosphatase and turbidity tests in their application to sterilised milk. High temperatures lead to high phosphatase values, due presumably to the formation of reducing substances which react with the Folin-Ciocalteu reagent. Although the control values also rise with increasing temperature, it is a pity that this test was adopted for sterilised milk without a proper study and understanding of the test. High temperatures also produce a yellow colour in the filtrate prepared for the turbidity test.

Kosikowsky and Dahlberg[89] have evolved a method for separating tyrosine and tyramine which interfere with the phosphatase test for ripened cheese. The phosphatase-formed phenol is extracted by acid-ether and estimated.

Sanders and Sagar[90] have studied the heat inactivation of phosphatase in dairy products using an accurately controllable laboratory pasteuriser. They found a linear relationship between the temperatures and the log of the time of heating. To reduce phosphatase to four units[91] required 37·5 min. at 143°, 30 min. at 143·7°, 24 sec. at 160°, and 15 sec. at 161·8° F. For a negative test about 0·7° F. lower was sufficient for skim milk, about 0·7° F. higher for 20 and 40 per cent. cream, about 4·5° F. higher for ice cream mix, and about 5·7° F. higher for sherbet than for whole milk. Phosphatase was much more easily destroyed in cheese at *p*H 5·3, and alkalis tended to stabilise the enzyme in cheese. In milk the enzyme is most stable over the range 6·5-7·4.

Phosphatase Activity

Hetrick and Tracy[92] in a similar investigation conclude that most of the phosphatase activity is located at the fat-serum interface. They record values (phenol p.p.m.) for dairy products as follows: whole milk, 2,080, cream (42 per cent.), 10,000, skim milk, 1,280, butter, 4,000, buttermilk, 12,800, butter oil, nil, butter oil sludge, 15,000, whey, 575. American pasteurising standards are somewhat more lenient than ours (143° F. for 30 min. or 160° F. for 15 sec.), and the authors draw attention to the fact that higher standards may be required for certain products.

Sanders[93] gives a description of the Sanders and Sagar modifications of the phosphatase test for various products such as cheese, cream, ice cream, sherbet mix, butter, buttermilk, and whey.

Vorstman[94] has studied the effect of *p*H on the Storch test; fresh milk only gives a positive result at *p*H values between 5·4 and 8·4, the optimum being from 7·0 to 7·5. The author advises adjustment of the milk sample to *p*H 7 using neutral red.

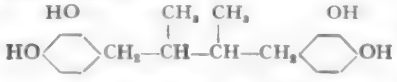
Krishnasmurti and Subrahmanyan[95] have studied the rennet-activity of a number of plant extracts and found that of the edible fig (*F. carica*) to be the strongest. Like calf rennet, it is affected by temperature, *p*H, and Ca. It is

inactivated by temperatures above 55° C. and can clot both animal and vegetable milks.

Greenbank[96] has reviewed the subject of oxidised flavours in milk and milk products, a problem which is of greater importance in U.S.A. on account of the greater extremes of temperature, more intense light, and greater prevalence of homogenised milk.

Bell[97] concludes that added ascorbic acid, producing a low Eh, greatly defers but does not prevent the development of oxidised flavour in frozen milk.

Stull *et al.*[98] have investigated the possibilities of nordihydroguaiaretic acid



as an antioxidant for dairy products. They found that 0·00125 to 0·0075 per cent. would prevent the development of oxidised flavour for five days at 40° F. in milk containing 0·3 p.p.m. added copper. In the absence of copper the antioxidant would retard the oxidation of vitamin C at 40° F. and also during pasteurisation. It was also effective for cream.

Skellon and Wills[99] have used benzoyl peroxide as a standard in their studies of iodimetric techniques for the determination of peroxidic oxygen in fats. Dowden[100] has used the NADI (dimethylparaphenylene diamine) reagent as a spot test for fat oxidation in milk powders.

Wright and Anderson[101] report that their fluorescence method for detecting chlorine (actually chlorate) in milk is sensitive down to 8 p.p.m. (approved hypochlorites contain about 100,000 p.p.m. chlorine and 0·7 per cent. sodium chlorate), but some aged milks fail to react at this level.

Volatile Acids

Miller *et al.*[102] have compared steam and vacuum distillation methods for the estimation of volatile acids in evaporated milk. They found 32 and 40 mg. formic acid and 134 and 70 mg. total volatile (as formic) acids per litre reconstituted milk by steam and vacuum distillation respectively.

Moyle *et al.*[103] have described a chromatographic method for the separation and estimation of volatile acids which should be useful to dairy chemists working on flavour problems.

Correspondence

To the Editor of
FOOD MANUFACTURE

DEAR SIR,—Our attention has been drawn to a note quoting Mr. Andrew Stewart, Chief Food Officer, Glasgow, published in your issue of August 1, 1950, regarding dates from Smyrna. Dates, so far as we know, do not come from Smyrna, which is well known for its figs. Dates sold in British markets are imported chiefly from Iraq and North Africa. Iraqi dates are packed under the most modern hygienic conditions, using the latest methods of grading, processing, fumigating, and packing, and pressing of boxes by foot is utterly forbidden.

Your correspondent may be interested to know that dates do not carry germs, neither do they afford a suitable breeding place for germs of any kind. Experiments were carried out by the Health Authorities of Iraq in November and December, 1927, in co-operation with the Health Authorities of Egypt, as to the possibility of the transmission of cholera by dates. Cases of dates, packed for export, were inoculated with live cholera germs and fresh stools from actual cases of cholera, and were then despatched to Suez, where they were immediately examined in the Egyptian Public Health Laboratories. No living cholera germs were discovered in any of the infected cases of dates. The shortest period between infection and laboratory examination was sixteen days. There appears little doubt that the large amount of sugar in dates acts as a disinfectant.

Yours faithfully,

ACTING DIRECTOR GENERAL,
DATE ASSOCIATION.

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101 *Dairy Ind.*, 569, 1948.
102 *J. Dairy Science*, 189, 1948.
103 *Biochem. J.*, **43**, 308, 1948.

(*To be continued*)

Quick Kippering of Fish

A new type of smokehouse which kippers salmon in one-eighth of the time formerly required and which produces a more uniform product has been placed in operation at Seattle, Washington, U.S.A., by the San Juan Fishing and Packing Co.

The old-type smokehouse was as much as four stories high. Air-smoke circulation was maintained by natural draught and could be controlled only to a limited extent, depending upon such factors as external weather conditions, size of the fire, and height of the smokehouse. The fish nearer the fire were cured much faster than those near the roof, thus necessitating considerable handling to produce a uniformly cured product.

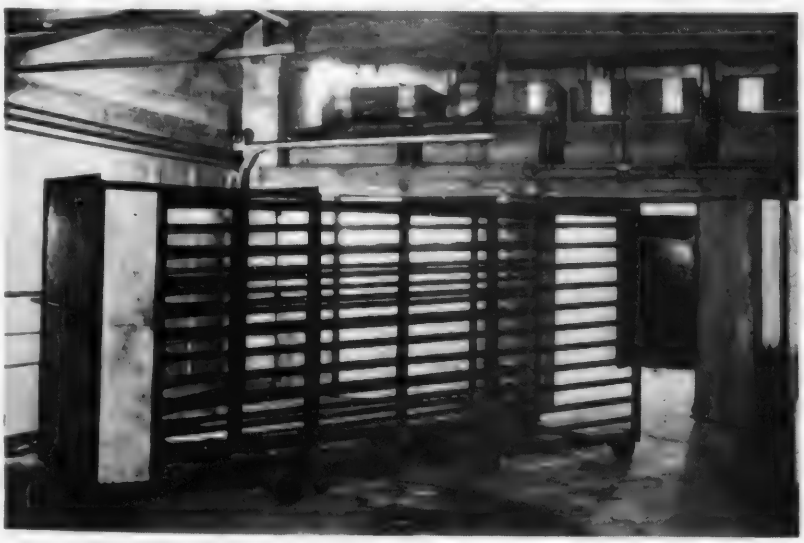
THE new San Juan smokehouse, 14 × 20 ft. in size and less than one story high, replaces an old structure 75 × 25 ft. in size and four stories high. Its four units, which can be used either for kippering, mild smoking, or hard smoking, have a total capacity of 10,000 lb. The old structure's two units could kipper only 6,000 lb. at a time, although its hard-smoking capacity was greater.

Overall view of the smokehouse, showing the double doors to each of the four units, with the housing for the radiator, blower, and exhaust house above.

Time-saving Process

By means of forced air, the new smokehouse kippers fish in six hours and hard smokes them in seven days, as compared to two days and twenty days under former methods. Each smokehouse unit holds three mobile racks, which, for kippering, hold 19 × 40 in. refrigerator-type trays made of galvanised steel wire, spaced about 6 in. apart on the rack. In hard smoking, these trays are removed and the fish hang on bars in three tiers.

The end of the rack nearest the door of the smokehouse unit has built-in baffles, which direct air across each tray or at each fish, as the case may be. On top of each unit is a steam radiator with 500 ft. of radiation and a fan with a capacity of 6,000 c.f.m. The fan draws fresh air through the radiator and blows it down into the smokehouse. After the air circulates through the unit, it is either exhausted or drawn through the fan and recirculated. Dampers permit partial or total exhaustion or recirculation.



Each smokehouse unit accommodates three mobile racks which enter the unit through the open door.

Pre-smoking Operations

When fish is being kippered, the heat is raised to 110°-120° F. for an hour and a half, while a "pellicle" forms on the fish. This pellicle is a hard crust which prevents the fish from being dried out. After the pellicle has been formed, cold smoke is introduced into the air stream and the temperature increased to 180° over a 60-minute period, then maintained at this level for 2½ hours. Another hour is required for cooling.

The fish are first filleted and then cut into chunks about 6 in. long, weighing about 1 lb. each. These chunks are dropped into a

The top of the smokehouse accommodates the radiator, blower, and exhaust house. Fresh air is introduced through the sheet metal "box" which is visible at the left below the steam pipes.

steel basket, which is carried by overhead rail to a brining tank. After soaking for 2½ hours, the chunks are lifted out and deposited in another tank, containing a solution of kipper-colour vegetable dye. After 4 or 5 minutes in the colouring tank, the chunks are placed on trays in the mobile racks, which then are wheeled into the smokehouse.

Fish Preparation for Hard Smoking

In preparing a fish for hard smoking, the fillets are soaked in brine in 825 barrels, with first a layer of salt, then a layer of fish. After being thus kept in cold storage for several months, the fillets are soaked in fresh water and placed on hangers in the smokehouse racks.

In hard smoking, no heat is used, the fan simply circulating smoke and fresh air. Mild smoking is the same as hard smoking but requires only three days. Salt herring is smoked for four days to make bloaters.

Smoke comes from a burner in the basement. Alder logs are the usual fuel, although sometimes sawdust smoke is required, and then a few shovelfuls of fine sawdust are placed over the smouldering alder logs. The sawdust gives a heavier smoke, principally used to obtain a good colour on the fish.

The smoke is exhausted up the chimney until desired for the smokehouse. Then it is drawn by the smokehouse fan through spun-glass filters, changed every 24 hours, and up the pipes to the top of the smokehouse. Cooling is accomplished by the length of the pipe, part of which passes through an earthfill outside the furnace room.

Fire Precautions

The pipe leaving the smoke generator dips like a U before leaving the furnace room; small holes in the pipe at the bottom of the U allow the draining off of creosote which collects in wood smoke. To enable immediate extinction of a fire, should one ever develop in this pipe, an automatic fire extinguishing system has been installed, since fumes from such a flame would ruin anything in the smokehouse. Should the temperature reach 160° F., a fusable link melts and closes a damper, thus smothering the smoke. Should this be inadequate and the temperature reach 180° F., CO_2 is automatically introduced and the fan shut off.

Control panels for two of the smokehouse units. The dials register air pressure and exhaust and volume controls, while the knobs below them regulate the air pressure. Recorders indicate the wet- and dry-bulb temperatures.

The smokehouse is of concrete construction, with walls, floor, and ceiling 6 in. thick. Rock wool and sheet rock insulation is covered with concrete plaster. Total cost is estimated at $17,000.

Control Units

Each unit has separate controls, allowing simultaneous kippering and hard smoking in adjacent units. Smoke controls are operated manually from a control board outside the smokehouse, with a separate control for each pipe in each unit. Other controls on this board regulate the air intake, exhaust, and volume control dampers by means of air motors attached to each damper. The amount of air pressure varies from 1 to 15 lb. with the extent of opening required. When the dials register 7 lb., for example, the dampers are half-open. Separate push-buttons on the control board start and stop the fan for each unit.

Wet- and dry-bulb temperatures are recorded electronically on the control board through pickups at the point where the circulated air leaves the smokehouse. A drip valve introduces sufficient water to keep the wet-bulb reading 30° below that of the dry-bulb or Fahrenheit recording.

Our Contemporaries

ROTARY drier design, liquid film dehydration, and flash and spray drying are the subject of a review on drying developments by A. L. Waddams, A.R.C.S., B.Sc., A.M.I.Chem.E., published in the October issue of *International Chemical Engineering*. In the same issue, D. F. Riley, B.Sc., A.C.G.I., reviews the latest published work relating to powder mixing and liquid agitation.

The Effects of Ethylene on Fruits and Vegetables

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Ethylene is a colourless, inflammable gas, slightly lighter than air. It has a sweetish smell, and is present in coal gas and in the natural gas sometimes found in oil fields. It is also produced in small quantities by some ripe fruits. How the gas was found to have an effect on the physiology of fruit is uncertain; probably it was noticed that escapes of gas, used to heat rooms in which bananas were ripened, led to faster ripening. Be that as it may, ethylene has been used for ripening bananas in the U.S.A. since about 1930.

MORE is becoming known about the properties of ethylene and of its uses in the ripening of fruits, although the precise details of how the gas exerts its effect, or how it is produced by fruits, are still in doubt. Kidd and West's studies of the respiration of apples and pears led to the discovery of the "climacteric" effect in respiration—that is, the sudden acceleration of the rate of production of carbon dioxide which takes place when fruits held at ordinary or high temperatures begin to lose their green ground colour and turn yellow, and to develop the odours characteristic of ripeness.

Ripening of Fruits

It was found that apples or pears in bulk ripened faster than did single fruits, and this was traced to the fact that individual fruits, ripening earlier than others, were giving off a gas which induced the climacteric, or in other words, began the ripening, of the slower-maturing fruits. Gane was the first to show that this gas was ethylene.

Apples and pears are cool-stored, or gas-stored, to reduce the rate at which they ripen. Stimulation of ripening by ethylene is an undesirable effect, and for this reason fruit which is to be stored should be cooled as quickly as possible. The cooling delays the onset of the climacteric, and thus retards the effect of the naturally produced ethylene on the slower-ripening fruits. For the same reason an early maturing variety should not be stored with a late maturing variety.

The rate at which ethylene stimulates ripening depends on its concentration; a high concentration produces a quicker effect than a low one, and a very low concentration of ethylene may have no effect at all. When apples or other fruits are cool-stored, the objective is to reduce the rate of ripening as much as possible, and thus it is desirable to prevent the accumulation of ethylene by ventilating the store.

The Use of Ethylene

Our aim is sometimes to accelerate the ripening of fruits, or to ensure that all the fruit in a consignment ripens at a uniform rate. It is then natural to enquire if ethylene can help in obtaining the desired effect. As the following examples show, ethylene may be used to assist ripening of certain fruits, but it should not be used indiscriminately. The gas has no appreciable effect on some fruits, and produces undesirable effects on others.

In some countries it is standard practice to use ethylene, in a concentration of one part per thousand of air, in banana-ripening rooms. The ripening of the new varieties of banana, such as the Lacatan, which are beginning to arrive on our market, is considerably improved by ethylene.

Tomato Ripening Experiments

In recent years the practice has been increasing to pick tomatoes either green or just beginning to turn, and to ripen them at about 65° to 70° F., usually with ethylene added to the air. Without going into the question of the desirability of this process, or comparison of the flavour of fruit ripened in this way with that of fruit ripened on the plant, it is known that the artificially ripened tomatoes are usually of fairly good quality. Artificial ripening of green or turning out-of-door tomatoes at the end of the season will increase the saleable crop, but whether ethylene is beneficial or not is doubtful. The results of tests which have been carried out in this laboratory over a number of years do not encourage the use of ethylene.

In our experiments, where the rates of ripening of similar tomatoes, whether grown outdoors or under glass, have been compared in air and in air+ethylene, we usually found that the ethylene had no effect. In some of the tests it was found that both lots of tomatoes ripened at the same rate until three-quarters of them were ripe, and then the sample treated with ethylene began to go ahead. We noticed faster ripening of the whole sample treated with ethylene in a few experiments only, in 1948. The tomatoes used in our experiments in 1949 showed no response to ethylene.

Effect of Ethylene on Plums

W. H. Smith has done extensive work on the effect of ethylene on English plums, and his general conclusion is that its use is not desirable. He used the varieties Myrobolan, River's Early, Czar, and Monarch, and concentrations of ethylene ranging from 1 part in 50 of air to 1 part in 150,000. The plums treated with ethylene softened more rapidly than those in air alone, and they changed colour and developed the typical odour of ripe plums faster, but their taste was unaltered. Analyses showed that they were no less acid or more sweet than the plums which had

Courtesy Agriculture, **57**, 6, 1950.

not received ethylene. Smith also frequently noticed that the colour of the plums which had been given ethylene was not normal.

This behaviour seems to be typical for all plums, with one exception—the South African Kelsey plum. This is reputed never to ripen normally, even in South Africa, but Putterill showed that when Kelsey plums were given acetylene they ripened normally. The really ripe Kelsey plum is purple, and not the yellow-orange colour normally seen in this variety. We have shown that ethylene produces an effect similar to acetylene, and some merchants now treat Kelsey plums in this way before selling them.

Citrus Fruits

Some citrus fruits do not produce ethylene during storage; the lemon is one of them. Thus storage of yellow lemons with green lemons does not lead to shorter storage life of the less mature fruit, as would happen with, for example, apples. But Biale has found that if rotting lemons are present in the store, the sound lemons will colour faster and have a shorter storage life. He has shown that one of the species of *Penicillium* which causes the rotting gives off ethylene, and that lemons are sensitive to this gas. The rate of respiration and development of colour are markedly accelerated by the ethylene given off by the mould.

Effect of Volatile Substances

In connexion with experiments on the effect of volatile substances (including ethylene) on apples during storage, analyses have been made of the amount of ethylene present in gas stores. The results were astonishing. It was found that a gas store containing Bramley's Seedling apples could contain one hundred parts of ethylene per million, and that the concentration of ethylene in a store containing Cox's Orange Pippin apples could rise as high as six hundred parts per million. Such concentrations in air would lead to rapid ripening of the apples, yet apples can be kept in a firm condition, with green ground colour, for as long as it is economically necessary to do so, in gas. The experiments have not yet shown if ethylene has any marked effect on the respiration of apples in gas, and work is being carried out to ascertain what happens if the ethylene is removed.

Other Effects of Ethylene

Ethylene can produce effects on fruits other than stimulation of respiration. Kidd and West have shown that one type of spotting of the lenticels of apples (such as is caused on Bramley's Seedlings if they are put into a store containing Worcester Pearmain apples) is similar to that caused by ethylene.

There are sensitive chemical methods for detecting the presence of ethylene, and determining how much of it is present. The most sensitive tests for ethylene, however, are the so-called "biological" tests, which depend on the way parts of plants respond. The "sensitive plant" (*Mimosa pudica*) has leaves and petioles which collapse when they are touched. The leaves also collapse if the plant is placed in an atmosphere containing ethylene. If the concentration of ethylene is more than a few parts a million, and the exposure is prolonged, the plant sheds its leaves. The elongation of many seedlings is prevented, or slowed down greatly, by ethylene. Concentrations as low as one to ten parts in a million parts of air produce marked effects. Thus it is possible to test for the presence of ethylene in a stream of air by passing it over germinating seedlings, and comparing their rate of growth with that of similar seedlings kept out of contact with ethylene.

Prevention of Potato Sprouting

The sprouts produced by potatoes in store are young plants, and it is therefore not altogether surprising to find that the sprouting of potatoes is prevented by ethylene. Furlong has stored large quantities of potatoes at 45° F. in a store containing one part in ten thousand of ethylene, and in another store without ethylene. At the time that the potatoes in air had all sprouted, with shoots of 6 inches maximum length, only 2·8 per cent. of the potatoes treated with ethylene had sprouted, and the longer shoots were one-sixteenth of an inch long.

Experiments with Celery and Oranges

Experiments carried out in America have shown that ethylene can be used to blanch celery, but preliminary experiments last year in this laboratory, using the variety Mârket White, were unsuccessful. It was found that green celery, stored in the dark, blanched as rapidly when kept in air as when given ethylene. The blanching of green celery is due to destruction of the pigment chlorophyll. It is known that ethylene often hastens the disappearance of chlorophyll from green fruits. The Valencia orange develops its yellow pigments on the tree, but at certain times in the picking season they are masked by chlorophyll, so that the oranges are green. They are "degreened" by holding them at a high temperature, and high relative humidity, in the presence of ethylene. This treatment has another effect: the oranges shed the "buttons," or stalk attachments. With oranges from some regions this results in a reduction of stem-end rotting.

The manner in which such a relatively simple compound, ethylene, can exert such profound effects as those described, is one of the most baffling and interesting problems of plant physiology. Even with the increasing refinement of experimental methods which is rapidly taking place it may remain an unsolved problem for some years.

This paper was prepared as part of the programme of the Food Investigation Organisation of the Department of Scientific and Industrial Research.

TO AUTHORS

FOOD MANUFACTURE is prepared to consider the publication of any books on scientific and technical subjects which authors might care to submit.

Substitutes for Sugar

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Among war-time and peace-time substitutes, there are probably few that have been more assiduously sought after than those for sugar. Owing to the fact that sugar is still rationed, many manufacturers' outputs are curtailed, but there are available a few products which, although not having universal application, are capable of helping out with certain items of food.

AS a general rule, after their war-time experience, the word "substitute" is anathema to consumers. This prejudice, however, is not by any means of such recent origin. For instance, on the introduction of beet sugar some 150 years ago the opinion was strongly held that it was not so sweet as cane sugar, and this idea still persists to a certain extent despite the fact that the sucrose from the sugar beet and the sugar cane are chemically identical and, in the refined state, are indistinguishable in taste and properties from each other.

Saccharin and Dulcin

Certain compounds, such as saccharin and dulcin, possess a more intense sweetness than sucrose. Their taste, however, although sweet, does not always simulate that of sugar, being at times inclined to bitterness. Owing to this intense sweetness and, with some, their lack of solubility, they cannot be used to preserve foods, and they will not help jam to set.

Carbohydrates produced by the digestion of starch, invert sugar, and, possibly, sucrose from some unusual sources are substitutes of a type other than dulcin and saccharin.

Table I lists the sweetness of some of the common sugars. While it is true that relative sweetness is very difficult to measure, and that such factors as concentration must be taken into account, the figures serve as a useful guide.

TABLE I

Sugar.	*Sweetness. Per cent.*	*Reference.*
Sucrose	100	—
Fructose	173	Biester, Wood, and Wahlin, *Am. J. Physiol.*, 1925, **73**, 387.
		Willamen, *Z. Ver. Deut. Zuckerind*, 1939, **5**, 255.
Dextrose	74	Biester, Wood, and Wahlin, *loc. cit.*
	62-83	Turnbow, Tracy, and Raffetto, "The Ice Cream Industry," 2nd Ed.
Maltose	32	Biester, Wood, and Wahlin, *loc. cit.*
Lactose	16	*ibid.*
High conversion corn syrup	39-68	Turnbow, Tracy, and Raffetto, *loc. cit.*
Confectioners' corn syrup	30-51	*ibid.*
Honey	71-94	*ibid.*

Turnbow, Tracy, and Raffetto (*loc. cit.*) give a table that expresses some of the above facts with special reference to ice cream flavouring (see Table II).

TABLE II

Sugar.	*Lb. dry matter added by substance to ice cream to produce the same sweetness as 1 lb. sucrose.*
Sucrose	1·00
Dextrose	1·10
High conversion corn syrup (enzyme conversion)	1·23
High conversion corn syrup (acid conversion)	1·38
Confectioners' corn syrup	1·76
Honey	1·07
Invert syrup	0·85

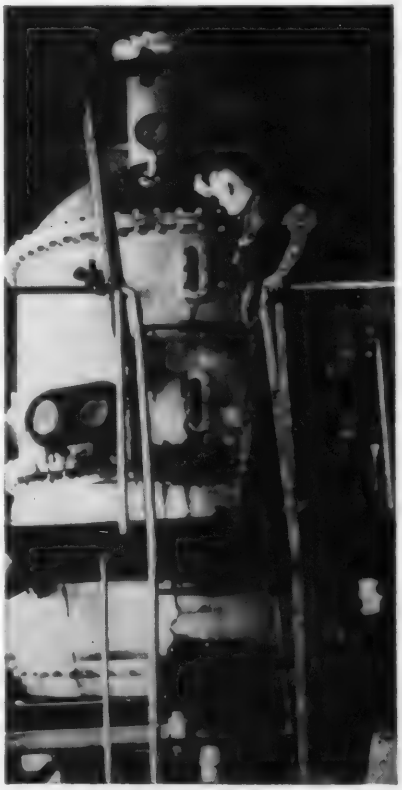
Consideration of Tables I and II shows that manufacturers, in looking for sweet substances as substitutes for sugar, are limited to the use of dextrose, honey, invert sugar, or liquid glucose (confectioners' corn syrup). High conversion corn syrup is not available in Great Britain. Of these, only honey is at present available free of permit.

Another available sweetening substance, free from restrictions and not mentioned in the Tables, is hydrol, a by-product of dextrose manufacture.

Hydrol is the mother-liquor left after the crystallisation of dextrose monohydrate. In the U.S.A., this product is really "dextrose molasses," as the dextrose liquors are exhaustively crystallised, resulting in a great accumulation of impurities in the residual mother-liquor. In Great Britain, the liquors are not nearly so "exhausted" in the crystallisation process, which results in the manufacture of a much purer product.

A typical analysis of the solids of the British product is:

	Per cent.
Reducing sugars (as dextrose)	72-80
Ash	2



Sugar concentration pan.

The mixture is run off into special paper containers and automatically weighed.

The carbohydrates in hydrol, other than dextrose, have not been examined in sufficient detail to be completely characterised, but the presence of gentiobiose and other di- and tri-saccharides has been reported.

Effects of Blending

Honey is naturally hazy, and has a strong, characteristic flavour. Hydrol has a pronounced bitter flavour. The colours of honey and hydrol are too dark for many applications, but by blending honey and hydrol and submitting the mixture to suitable refining processes a clear product that is reasonably light in colour and is without any pronounced taste other than sweetness can be obtained.

An analysis of a typical product of this type is:

	Per cent.
Dextrose (anhydrous)	36·0
Invert sugar ..	34·6
Cane sugar (Clerget inversion) ..	2·9
Other carbohydrates	6·8
Ash	0·9
Nitrogenous substances (N×6·25)	0·3
Water	18·5
	100·0

Sweetness:	About 80 per cent. that of sucrose, weight for weight
Colour (10 per cent. solution, 1 in. cell):	3 Lovibond Series 52

Another useful, but darker, material can be obtained by blending date syrup, a sugar by-product syrup, and hydrol, and suitably refining the mixture. The analysis of this product is given in Table III.

Both these products are reasonably sweet (10 lb. of either should replace 8 lb. of granulated sugar). Provided the refining has been efficiently and suitably carried out

TABLE III

	Per cent.
Dextrose (anhydrous)	36·0
Invert sugar ..	22·8
Cane sugar (Clerget inversion) ..	13·6
Other carbohydrates	6·3
Ash	1·9
Nitrogenous substances (N×6·25)	0·9
Water	18·5
	100·0

Sweetness:	About 80 per cent. that of sucrose, weight for weight
Colour (10 per cent. solution, 1 in. cell):	50 Lovibond Series 52

both will be clear, and their flavours quite reasonably free from any really strong, characteristic note, the honey-hydrol mixture being the better in this respect.

In the main they both consist of the reducing sugars, dextrose, and fructose, and can, therefore, be fermented by yeast. They may be used in such products as buns or ginger beer as a source of food for the yeast. The honey-hydrol mixture would be the better in buns, as it has a lighter colour. The granulated sugar in these products could be completely replaced if desired.

Either mixture could be used to replace part of the sugar in cake

After filling into cartons, the mixture is solidified in air-conditioned chambers.

mixes, 1 lb. of sugar in every 10 lb. being replaced with 1¼ lb. of either. In this case also the honey-hydrol mixture would be the better for the lighter coloured type of cake. It might be found necessary to increase the liquor in the mix by an amount equal in weight to the sugar substitute.

Use of Sugar Substitute

In such products as bakers' cream fillings, 1-3 lb. of sugar in every 10 lb. could be replaced by 1¼-3¾ lb. of either of these mixtures, with the usual reservation about colour.

Puddings, pickles, and sauces may be sweetened with either of these mixtures, 10 lb. of which being equivalent to about 8 lb. of sugar. For soft drinks, the colour must be carefully watched in the case of a light-coloured drink. Even a partial replacement of sugar in a product of this type enables the manufacturer to increase his output quite appreciably.

The requirements of S.I. 1950, No. 596, as regards the minimum sucrose content of soft drinks, must be taken into account. It might be better to regard sugars of the type considered here as alternatives to saccharin in soft drinks. They will add the "body" that is lacking when saccharin is used.

Prevention of Crystallisation

As products of this nature consist not of sucrose, but of reducing sugars, they can be used to prevent crystallisation in such products as jams, jelly tablets, or boiled sweets, in the same way as invert sugar is used. As both of the products contain less fructose than invert sugar, boiled sweets made in this manner would be less hygroscopic than when pure invert sugar is used. The incorporation of honey-hydrol in these foodstuffs would naturally increase a manufacturer's possible output, as he would be replacing the rationed sugar from which he makes his invert syrup by the unrationed mixture.

As mixtures of this type in time set solid owing to the crystallisation of the dextrose, many users find it more convenient to buy them in solid form in a special paper wrapping, which eliminates the need to return "empties." The solid form dissolves quite readily in warm water, or can be melted to a syrup by warming to 130°-150° F. for some time; the solid broken into pieces could be placed in a container that is immersed in boiling water. Once melting has started, it will proceed quite rapidly by stirring the solid and syrup from time to time.

While mixtures of this type cannot entirely replace granulated sugar, they can fulfil a useful function in helping manufacturers to increase their output of products for which the size of the sugar allocation is a limiting factor.

(*Concluded at foot of next column*)

Antibiotics and Fish Spoilage

OVER ten years ago the comparative value of a number of substances in delaying bacterial spoilage of fish was investigated at the Pacific Fisheries Experimental Station. From the industrial standpoint, the single significant discovery which resulted from this work was the finding that potassium or sodium nitrites were relatively effective fish preservatives.

Attempts have since been made to discover a preservative for fish which would prove more effective than sodium nitrite. Substances tested such as ethylene oxide, propylene oxide, and methyl bromide, which have been used in certain foods as bactericidal or insecticidal agents, did not prove at all promising.

The past few years have seen the discovery and industrial development of a number of new antibiotics, several of which will prevent growth of certain bacteria which are resistant to penicillin and streptomycin, and the present experiments (*Progress Reports of the Pacific Coast Stations*, No. 83, 1950) were undertaken in order to ascertain whether some of these newly developed antibiotics would hinder growth of bacteria which cause fish spoilage.

For the sake of uniformity, the antibiotics or preservatives were incorporated into minced fish flesh as freshly prepared aqueous solutions. The samples were stored in sterilised covered glass containers at either 33° F. or 37° F., and the rate of bacterial spoilage was determined at suitable intervals by a direct bacterial count method.

Results of Experiments

Results obtained with halibut, red spring salmon, and brill show that dehydroacetic acid (sodium salt) exerted a mild bacteriostatic action in rather high concentrations, and a marked pro-oxidant effect in treated samples of spring salmon in which rancidity and pigment bleaching were very evident. Nitrite strongly retarded bacterial growth and, unlike any of the other substances studied, entirely prevented the normal bleaching of the red salmon pigments and the accompanying rancidity. This is interesting because in frozen fish nitrite favours development of rancidity.

The monobromoacetic acid ester (Sopura) exerted a very strong bacteriostatic action with halibut; but with spring salmon, which in the experiment was particularly rich in fat, there was no noticeable inhibition of bacterial growth.

Subtilin proved completely valueless as an inhibitor of bacterial growth, and available results with penicillin and streptomycin indicate that their preservative action is but feeble.

Fairly good preservation was obtained with chloromycetin at 25 and 50 p.p.m. levels, but in all tests so far made the most consistent results have been obtained with aureomycin. In all instances this antibiotic has occasioned a very marked suppression of bacterial growth at levels of 25 and 50 p.p.m., and in two experiments a level of 10 p.p.m. has proved very effective. So far terramycin has been tested in only one experiment, but in this, even at 10 p.p.m. level, it proved as effective as aureomycin.

Quaternary Ammonium Compounds in Food Factory Hygiene

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In 1948 an article published in FOOD MANUFACTURE[1] discussed the chemical, physical, and bactericidal properties of surface active cations and their possible uses in food processing and service. In the main this dealt with quaternary ammonium compounds, although reference was made to certain amine salts which could also be included in the general review of surface active cations. Since then the use of these compounds in the food production industries has increased considerably, and fresh uses are continually being found for these chemical aids to sterilisation and sanitisation.

QUATERNARY ammonium solutions are today being used in widely differing food production units—for example, cheese factories, fruit and vegetable canneries, fruit juice plants, abattoirs, fish canneries, frozen food factories, and breweries. In addition, the use of these compounds in the ice cream industry and in the catering world has become well recognised, and they may now be considered as established agents.

Development of Compounds

The development of this class of compound in practice has led to the publication of a considerable amount of literature relating to their general properties and applications, the greater part of which has been produced in the United States, where the use of these compounds was taken up enthusiastically towards the end of the war. Much of this literature deals with the development of suitable testing techniques for these compounds, it having been realised that their physical properties can lead to misinterpretations when older and less suitable techniques are applied. A paper by Klarman and Wright[2] in 1946 revealed that the existing United States official techniques gave a much exaggerated picture of the activity of these compounds, which they claimed was unfair to existing sterilising compounds. Although some of their statements would appear to have been refuted by subsequent work, they brought about a change of view regarding practical testing methods.

Some salient points of what became a rather acrimonious controversy were discussed last year.[3, 4, 5] This discussion has ended, but more recent papers have been concerned with modes of action, toxicity, and methods for field estimation.

The best known of the quaternary ammonium compounds are:

(*a*) Alkyldimethylbenzylammonium halides, such as B.T.C., Roccal, Zephirol, and Triton K-12.

(*b*) Alkylphenoxyethoxyethyldimethylbenzylammonium halides, such as Phemerol and Hyamine 10X.

The foregoing are U.S.A. products, and as far as it is known are not manufactured in the United Kingdom.

(*c*) Alkyltrimethylammonium halides: stearyltrimethylammonium bromide (obtainable in the U.S.A. and in the United Kingdom) and variations of these in which one of the methyl groups is replaced by an ethyl group can also be found in the U.S.A.

(*d*) Compounds where the benzyl group contains chlorine substituents such as alkyldimethyl 3,4-dichlorobenzyl ammonium chloride, known as Tetrosan (U.S.A.), but this type of compound is not on the market in Great Britain.

(*e*) Compounds containing heterocyclic nitrogen: cetylpyridinium and laurylpyridinium halides are both known and manufactured in Great Britain and the U.S.A. Alkyl*iso*quinolinium halides are also known but not very much used.

(*f*) Dialkyldimethylammonium compounds: dioctyldimethylammonium bromide, Diometam, and didecyldimethylammonium bromide Deciquam, developed in Great Britain only.

To summarise this review of available products, approximately twenty separate chemical identities are sold commercially in the United States under various names, but in Great Britain no more than five or six.

The development of the twin chain series of compounds in Great Britain has already been referred to, and some papers have been published on the subject;[6] further work has revealed some striking differences in behaviour between this class of compound and the single chain class in which all the other quaternary ammonium compounds can be placed.[7] There is still, in practical publications, far too great a tendency to generalise about the properties of quaternary ammonium compounds, whereas differences in chemical structure make for profound differences in physical properties of their solutions and of the complexes which these compounds form with other substances.

Chemical and Biological Activity

The significant factor about the surface active quaternary ammonium compounds is the long chain which confers the surface activity on the molecule; therefore the first steps in the classification of quaternary ammonium compounds must be:

(*a*) The number of chains in the molecule which contribute towards surface activity.

(*b*) Whether these chains contain any unsaturated linkages such as in the oleyl group.

(*c*) Whether such surface active chains contain other elements such as chlorine atoms.

(*d*) Whether the non-surface active groups contain elements other than carbon and hydrogen.

All these points make for big differences in chemical and biological activity, and activity against different groups of organisms may also vary considerably. Naturally, commercial prepara-

tions may vary in purity and in content of an active material, while in solutions the presence of alkali halides such as sodium bromide may affect other important properties—for example, powers of corrosion.

Non-corrosive Action

Since these compounds are also wetting agents, it is possible to get an effect on iron which might give the impression that the solution was corrosive; such an impression would, in many cases, be erroneous, as is shown by the following experiment.

If a piece of mild steel is placed in a wetting agent solution, whether anionic or cationic, of a sufficient strength to have a low surface tension of not more than 35 dynes per centimetre, and is left for a day or two, it will be noticed in most cases that rusting takes place for an inch or two above the solution line; that is to say, that part of the iron which has been wetted and cleaned by the surface active solution, although it is actually not immersed in the solution itself, has been prepared in an ideal condition for the attack by atmospheric oxygen. Hence the rusting takes place because of the contact of the air with the film of surface active solution on the iron above the solution line, whereas below the solution line the iron remains clean and entirely unaffected.

Effect of Hard Waters

Some American workers[8, 9, 10] have reported that the degree of hardness of the water in which the sterilising solution is prepared can have a profound effect upon the efficiency of the solution. It is further claimed[10] that complete inactivation of a solution of 200 parts per million of a quaternary ammonium compound was achieved with 10 parts per million of ferric iron. Data will shortly be published showing that in a range of hard waters selected from various parts of the country the quaternary didecyldimethylammonium bromide is scarcely affected in its activity at all, whereas members of the long chain types tend to be very much affected, especially where activity against Gram negative organisms such as *E. coli* is concerned.

This problem is also related to the general problem of inactivation by anions whether inorganic or organic, and it cannot be too strongly emphasised that each compound must be assessed for these reactions individually, and generalisations, even within the same group, can be dangerous.

Inactivation by Anions

Where the question of inactivation by anionic materials is a consideration, it is important to determine just what physical form the complex takes in the solution, whether it is thrown out as a crystalline precipitate or solid floc, or whether it remains as an oily suspension. Data have been produced showing that this has a profound effect upon the residual activity of solutions which have thus been treated. Interest in this part of the subject is by no means solely academic, but is of great importance in practical usage. Not only does it influence the killing power of the solution being used against various organisms, but also the length of life or number of times which the solution can be used depends very largely on such properties, and upon the inactivation effect which suspended organic matter may have.

When the statement is made that quaternary ammonium compounds react readily with proteinacious substances, it is necessary to ascertain what substance and what quaternaries. Any acceptance of sweeping statements of this kind is misleading.

Twin Chain Quaternaries

A paper read before the Society of General Microbiology[11] discussed the bactericidal powers of a number of twin chain quaternaries, beginning with dihexyldimethylammonium bromide and going up to didodecyldimethylammonium bromide. Even with the latter the limits of bactericidal activity had not been reached although this compound contains twenty-four carbon atoms in its two surface active chains. It had the highest activity of any of the compounds although it was only sparingly soluble, whereas with the single long chain type eighteen carbon atoms appear to be the maximum; after this insolubility presumably prevents the activity being extended.

Naturally, solubility has a great influence on practical use, since a sparingly soluble substance can be more readily thrown out of solution by the effect of a common ion or the presence of more soluble but incompatible materials.

Toxic Reactions

With the advance of usage of these compounds the question of toxicity has come to the fore, and each compound should be judged on its own merits. So far the main interest in this direction has been focused on chronic toxicity, since it was easy to determine that the amounts required to produce acute toxic effects were quite considerable, and would amount to several ounces of solid quaternary ammonium compound to be eaten by the average human being; even then fatal results are by no means certain, although obviously a considerable degree of suffering would be caused because of the surface active nature of the compound and the ease with which it would be adsorbed on to membranes, etc.

Presumably the users of chlorine sterilisation have never asked themselves what would be the effect of taking half a teaspoonful of liquid chlorine, *i.e.* liquid chlorine released from a cylinder under pressure. In weight this would be very much less than the amount of solid quaternary necessary to produce toxic reactions, but the effect of such a small quantity of chlorine would, of course, be fatal. This is perhaps an unfair comparison, because in dilute solution active chlorine is so readily reacted upon by such a vast variety of compounds that in such solutions it does not for long have an independent existence, whereas in dilute solutions quaternary ammonium compounds can exist for a very long period of time.

Will a few parts per million of a quaternary ammonium compound

taken over a long period of time, say months, produce any ill-effects? This question is still being asked by people interested in the use of these sterilising agents. Obviously results on chronic toxicity take longer to obtain than do results for acute toxicity due to massive doses. From the very nature of the molecule, however, one would expect that, taken internally, the minute quantities would be adsorbed on to organic matter in the stomach and intestines, since the ratio of organic material in these organs to the amount of quaternary would be several millions to one or more. Complete adsorption and eventual removal from the system would therefore be expected; in fact, it is anticipated that no chronic toxic effects would be observed.

Tests for Toxicity

Experiments by Shelanski[12] in which a group of dogs drank nothing for six months except 1-5,000 solutions of quaternary ammonium compounds, and in whose organs in the subsequent autopsy no abnormalities whatsoever were found, provides a good indication of the sort of result to be anticipated in this direction.

Again, the type of quaternary ammonium compound must be borne in mind. In Shelanski's work four different American quaternaries were tested. From pharmacological opinions, pyridinium or *iso*quinolinium compounds might be suspected of having physiological activity in excess of that to be anticipated from open chain nitrogen compounds, but so far no published work throws any light on this point, and, so far as oral toxicity is concerned, one would expect the same rules to apply as to the other quaternary ammonium compounds.

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Conversion of Bakery Units

A RECENT case of the conversion of a solid-fuel-fired steam-tube oven into gas firing is where the firebox occupied approximately only half the width of the oven, owing to the concentration of the tubes of the bottom deck into a double row in the firebox.

For conversion, a mild steel burner box, lined with refractory bricks and housing a 1¼ in. drilled bar burner, was fitted direct into the existing firebox, the only structural alteration being a slight trimming of the brickwork to allow the burner box to be installed. The original cast-iron furnace door was replaced by a front plate lined with refractory bricks, in which was inserted a cast-iron lighting port. The ashpit front was partially bricked up to leave only a 1 in. space for secondary air admission between the bricks and the steel front plate through which the burner projects. Strips of "Luminite" board were laid along the projecting ends of the steam crown tubes on the top and middle deck staggered to act as baffles to direct the flow of the hot flue gas circulating through the combustion chamber on flue-way. Each refractory sole, which carries goods to be baked, has under it tubes for radiating heat and over it, in the crown, tubes which radiate heat downwards on to the goods.

Thermo-electric flame failure equipment was fitted as a safety measure, the hot junction being heated by means of a pilot burner passing through the centre of the main burner box at right angles, and visible from the cast-iron lighting port. No draught diverter was provided. Temperature control was effected automatically by an adjustable thermostat with a 24 in. stand, the first 10 in. of which was sensitive, and which was introduced into the side wall of the middle deck. Under normal working conditions the temperature variation between the three decks is approximately 25° F.

Throughput and Costings

The weekly throughput for this oven was 40 sacks of bread and £250 worth of confectionery. The maximum gas rate was 650 cu. ft. or 3·25 therms an hour with a governor set at 2 in. w.g., and in addition 90 cu. ft. or 0·45 therms of gas an hour were supplied through the by-pass. The oven heated up at an approximate rate of 1° F. a minute.

With a weekly consumption of 204 therms at 10·8d. per therm, the fuel cost is approximately £9 4s. 0d., as compared with a solid fuel consumption of 1½ tons of coal at 87s. 6d. per ton, amounting to £5 9s. 4d. plus cost of labour to relight ovens after week-end shut down and removal of ashes, etc., which totalled 10s. per week.

Another recent conversion of an entirely different bakery appliance was that of a hotplate used for baking pikelets or crumpets and heated by steam tubes conveying steam at a working pressure of 560 lb./sq. in., the steam being generated by solid fuel firing.

The installation after conversion gave the following results:

Time to heat from cold to a working pressure of 560 lb./sq. in. ...	1¼ hr.
Maximum gas rate ...	470 cu. ft. (2·12 therms) an hr.
Average consumption when baking at steam pressure of 560 lb./sq. in.	350 cu. ft. (1·57 therms) an hr.
Output...	700 pikelets an hr.
Flue gas analysis at maximum gas rate (Orsat):	
CO_2	10·5 per cent.
O_2	3·5 „
CO	nil
Pressure at burner due to flue pull	0·01 in w.g.

News from the Industry

FORTHCOMING EVENTS

Royal Institute of Chemistry

Meetings of the London and South-Eastern Counties Section of the Royal Institute of Chemistry to the end of 1950 are as follows:

Nov. 2. "The Nature of Plastics," D. Mahon, B.Sc. (film and lecture). 6.30 p.m. at Brighton Technical College.

Nov. 4. "Recent Developments in Rheology," G. W. Scott Blair, M.A., Ph.D., D.Sc., F.Inst.P., F.R.I.C. 2.30 p.m. in the Zoology Lecture Theatre, Reading University.

Nov. 8. "Rockets and Chemistry," J. G. A. Griffiths, B.A., Ph.D., F.R.I.C. (films and lecture). 7 p.m. at Isleworth County School, Ridgeway Road.

Nov. 9. Film display (with the West Ham Municipal College Chemical Research Club). 6.30 p.m. at West Ham Municipal College, Romford Road, London, E.15.

Nov. 13. "The Physical Chemistry of Haemolysis," J. H. Schulman, O.B.E., Ph.D., Sc.D. (with the Chelsea Polytechnic Chemical Society). 6.30 p.m. at Chelsea Polytechnic, Manresa Road, London, S.W.3.

Nov. 14. Film display. 6.30 p.m. at Norwood Technical College, Knights Hill, London, S.E.27.

Nov. 15. Visit at 2.15 p.m. to Thomas Morsons, Ltd., Ponders End, Middlesex, for registered students. Annual general meeting, followed by a discussion on "Terms of Engagement for Chemists," opened by R. Leslie Collett, M.B.E., M.A., F.R.I.C. (with the Association of British Chemical Manufacturers). 6 p.m. at the Waldorf Hotel, Aldwych, London, W.C.2.

Nov. 17. Annual dinner dance. 7 p.m. at the Connaught Rooms, Great Queen Street, London, W.C.

Nov. 21. "Some Applications of Infra-Red Spectroscopy to Organic Research," H. P. Koch, Ph. D. (with the Welwyn Garden City Scientists' Club). 8 p.m. at The Cherry Tree, Welwyn Garden City.

Nov. 22. Visit at 2.15 p.m. to the Royal Mint, London, E.C.3, for registered students.

Nov. 23. "Chemistry and Fire Fighting," N. O. Clark, B.Sc., Ph.D., A.R.C.S., D.I.C. 7 p.m. at the Sun Hotel, Chatham.

Nov. 27. Film display (with the Woolwich Polytechnic Scientific Society). 6.45 p.m. at Woolwich Polytechnic, London, S.E.18.

Nov. 29. Visit at 2 p.m. to Kodak, Ltd., Wealdstone, Middlesex, for registered students.

Dec. 6. Visit at 2 p.m. to the Distillers Company, Ltd., Hammersmith, for registered students.

Dec. 11. "The Manufacture of Inorganic Chemical Reagents," D. H. Bell, B.Sc., A.R.I.C. (with the London Section and Fine Chemicals Group, Society of Chemical Industry). 6.30 p.m. at the London School of Hygiene and Tropical Medicine, Keppel Street, London, W.C.1.

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Society of Chemical Industry

The following meetings complete the Food Group syllabus of the Society of Chemical Industry for 1950:

Nov. 6. Joint meeting with the London Section and Agriculture Group. "Scientific Aspects of Wine Production." Mr. R. Barrington Brock.

Nov. 8. Domestic meeting—The Significance of Aqueous Vapour Pressure in the Food Industry. "An Accurate Method for the Determination of Aqueous Vapour Pressure," Mr. F. R. Jones; "The Equilibrium Humidity of Concentrated Sugar Syrups and other Sugar Products," Mr. R. W. Money; "The Effect of Humidity on Mould Growth on Constructional Materials," Dr. J. B. M. Coppock and Mrs. D. E. Cookson.

Nov. 22. Microbiological Panel meeting—Recent Aids to the Study of Microbiology. Introduction, Sir Alexander Fleming; "The Electron Microscope," Dr. W. J. Elford; "Phase Contrast Microscopy," Mr. D. A. Tanfield and Dr. W. H. Hughes.

Dec. 6. Joint meeting with the Society of Public Analysts and Other Analytical Chemists. "Applications of Paper Chromatographic Methods in the Sugar and Allied Industries," Mr. H. C. S. de Whalley.

Dec. 7. Joint meeting with the Northern Ireland Section. "Present-day Knowledge concerning Milk and Milk Products," Mr. N. Knowles.

Dec. 18. Nutrition Panel meeting—Factors in Distribution Affecting the Quality and Nutritional Value of Foodstuffs. Second meeting of the series—"Cereals and Cereal Products."

Meetings of the Agriculture Group of the Society to the end of the year are as follows:

Nov. 6. Joint meeting with the Food Group and London Section (as above).

Nov. 7. Crop Protection Panel. "Physico-Chemical Problems in the Use of Insecticides," Dr. G. S. Hartley.

Nov. 21. "Magnesium as a Plant Nutrient," Mr. H. Trefor Jones.

Dec. 19. "Copper-Molybdenum Relationships in Disorders of Ruminants," Dr. H. H. Green and Dr. Ruth Allcroft.

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Royal Sanitary Institute

The following are particulars of meetings arranged by the Royal Sanitary Institute for November:

Leicester Sessional Meeting—November 3, at 10 a.m. in the Council Chamber, Town Hall. Papers on "The Development of Main Drainage in Leicester," by H. Bird, A.M.I.Mun.E., A.M.T.P.I., principal assistant, city surveyor's department, Leicester, and "Current Problems in Tuberculosis," by J. Cuthbert, M.D., D.P.H., F.R.F.P.S., chest physician to the Sheffield Regional Hospital Board. In the afternoon, visits will be paid to the eastern main sewer (under construction) and sewage works, and to the city open-air school and isolation hospital and chest unit.

Benjamin Ward Richardson Lecture—November 15, at 2.30 p.m. at Olympia, Kensington, London. This lecture will form part of the programme of the Public Works and Municipal Services Congress, and will be on "The Report of the Interdepartmental Committee on Meat Inspection," by G. R. Oake, chairman of the Interdepartmental Committee on Meat Inspection. Chairman: Sir Wilson Jameson, G.B.E., K.C.B., M.A., M.D., F.R.C.P., D.P.H. (Vice-President.)

Canterbury Sessional Meeting—November 18, at 2 p.m. in the board room of the Kent and Canterbury Hospital, Canterbury. Discussions on "'Q' Fever," to be opened by (*a*) B. P. Marmion, M.D., B.S., Public Health Laboratory Service, (*b*) G. Slavin, Dr.-Med.Vet., M.R.C.V.S., senior research officer, Ministry of Agriculture and Fisheries Veterinary Laboratory, and (*c*) M. S. Harvey, M.B., B.S., D.P.H., Medical Officer of Health, Canterbury; and on "Psittacosis: Recent Developments," to be opened by A. D. Macrae, M.B., Ch.B., Virus Reference Laboratory, Central Public Health Laboratory. The morning will be devoted to some historic almshouses, the Chartham Fine Paper Mills, and Canterbury Cathedral.

Milling and Bakery Services

OPENING OF NEW LABORATORIES

Demonstrations in the experimental bakery included samples of bread showing faults and an explanation of their causes, and also samples showing the effect of fermentation conditions on loaf quality. *Photo "The Builder."*

Attended by a large number of scientists and technologists, the opening of the new laboratories of Drs. D. W. Kent-Jones and A. J. Amos, at Dudden Hill Lane, Willesden, London, N.W.10., on September 21, 1950, marks a further important step in the progress of this well-known partnership.

Housed in a handsome two-storied red brick building, with its courtyard and flower beds, are the well laid-out laboratories. Half the space is occupied by the working benches, while the remainder is divided into five parts housing the balance and colour rooms, the microbiological laboratory, and two other special departments.

In the main laboratory, the bench tops, which are made of concrete and covered with acid-resisting material, are supported by brick piers, between which are fitted cupboards and drawers. The shelves for holding reagents which usually run along the middle of laboratory benches are absent; instead the reagents are kept in glass-lined cupboards at the bench ends. Kjeldahl digestion is carried out on the benches and the use of stink cupboards is obviated by the placing of the necks of the flasks in apertures in a four-inch pipe through which the fumes are carried away by a current of air.

These are some of the laboratories' novel features which facilitate tidy and efficient work.

Demonstrations of various tests were given by the assistants, including those for moisture determination, ashing, insect contamination, lead arsenic, particle size, granularity, grade colour, fibre, bleach, CO_2 for self-raising flour, and *p*H. An ingenious machine for the rapid estimation of gluten attracted attention.

The main exhibits in the dough testing room were the Buhler mill, Carter-Simon moisture oven, Chopin moisture tester, Alveographe, Zymotachegraphe, and Farinograph.

The work of the experimental bakery was demonstrated by an exhibition of soda bread loaves, samples of bread showing faults and an explanation of their causes, and also samples showing the effect of fermentation conditions on loaf quality.

The second floor houses a suite containing the offices of Drs. Kent-Jones and Amos, their secretaries, and a conference room.

Congratulations must be tendered to the two scientists on their fine conception of what a laboratory should be and to their architect for the design of the building to contain it.

To celebrate the occasion, the guests, numbering about 150, were entertained to luncheon at the Hall of the Worshipful Society of Apothecaries. Professor J. W. Cook, President of the Royal Institute of Chemistry, proposed the toast of "The Laboratories," to which Dr. Kent-Jones replied. Dr. Amos then toasted the guests and Mr. J. C. Wooler, ex-President of the National Association of British and Irish Millers, responded.

"Smokeless" Smoking Kiln

By means of a new electric appliance, known as the Myzer smoking kiln, fish can be cured in anything from 2 to 8 hours (according to the class of fish), poultry can be thoroughly smoked in a few hours, and hams, bacon, and sausages can be smoked in considerably less time than by continuous smoking.

The kiln is in the form of a cabinet, standing 7 feet high and measuring 8 feet wide and 2 feet deep. Driven by a $\frac{1}{3}$ h.p. electric motor, the kiln can be operated from any electricity circuit, and its running costs are low.

Curing is carried out by igniting a small quantity of oak sawdust in a tray placed under the kiln. The smoke is driven through the cabinet by a system of fans and ducting. The heat is thermostatically controlled at any required temperature up to 190° F., while in hot weather the smoke can be cooled to the desired temperature. When curing has been completed the "extractor" is switched on and within 20 to 25 minutes the cabinet is cleared of smoke.

A streamlined model, for export purposes, is in course of production and plans are on hand for a kiln of 60 stone capacity.

The electric smoking kiln for curing fish, poultry, hams, bacon, and sausages. Driven by a $\frac{1}{3}$ h.p. electric motor, it can be operated from any electricity circuit and its running costs are low.

Institution of Works Managers

The fourth programme booklet issued by the Institution of Works Managers gives details of the activities of the branches and groups of the Institution during the coming winter session, with a foreword by the retiring chairman, Mr. A. P. Young, O.B.E. The subjects to be discussed cover the whole field of works management and they will be introduced by the authoritative speakers, many of whom are members of the Institution. All subjects will be treated generally and will not be approached from the standpoint of any one particular industry.

One new branch will be inaugurated—the Notts and Derby branch—and groups have sprung up at Northampton and Preston. Visitors and students are invited to attend any of the meetings and to take part in the discussions.

British Chemicals in Chicago

At the invitation of the American Chemical Society, a range of new industrial chemical products for use by the various industries was displayed by the Watford Chemical Company at the National Chemical Exposition held recently in Chicago.

Featured in the display were the main compounds, enclosed in an atomic model of their basic molecular structure, with each hydrogen, carbon, and oxygen atom enlarged 6,400 million times.

Products for the food industry included a high grade of glyceryl monostearate, freed from acrolein and other impurities which are present in the commercial grade of this emulsifier. Used mainly in the American ice cream and margarine industries, this grade of product gives complete freedom from aftertaste and a high level of stability.

Granulating Mixer

Of entirely new design, although the basic principle is similar to its predecessor, the Manesty Granulating "H" mixer consists of a rigid cast-iron cabinet carrying the main spindle sleeve, on the front of which is mounted the overhung stainless steel container. The drive to the paddle is from a motor mounted on the end of the machine, through vee belts, on to the totally enclosed worm and wheel, the wheel shaft then passing through the spindle sleeve and connecting with the stainless steel paddle. The blades of the paddle are so arranged that thorough accuracy in mixing is obtained. Resting flat along the top of the container is the sliding stainless steel dust cover which prevents powder escaping during the mixing process. The safety guard made from stainless steel rods is just inside the container, and is so interlocked that on opening the motor automatically stops. Discharge is effected by means of a handwheel on the cabinet, the powder being tipped into a bin which can be placed completely under the container.

Provision is made for lubricating all the moving parts, and special precautions have been taken to prevent oil coming in contact with the powder. The worm and wheel run in oil, and no attention is required apart from maintaining the oil level. Bearings which are not easily accessible are fitted with self-oiling bushes.

All parts coming in contact with the powder are made from stainless steel. The end cover on the container can easily be removed and the paddle withdrawn, and the whole design of the machine makes for ease of cleaning.

Food Group Conversazione

The fourth annual conversazione of the Food Group of the Society of Chemical Industry was held on September 29 at the Technical Centre of Marks and Spencer. Members and guests, who were received by Mr. and Mrs. J. E. Sieff and Mr. and Mrs. A. L. Bacharach, had the opportunity of meeting a small party of Danish chemists who were visiting London.

The spacious and well-equipped textile, food, engineering, and photographic laboratories in which were exhibited many items of recently developed scientific equipment were inspected with interest.

As in previous years, the film of the annual tour was one of the high spots of the evening. Of fine standard, the film was noteworthy for its artistic shots interspersed with humorous ones which brought down the house. Great credit is due to Mr. R. J. Nicholls who took the films and also gave the commentary.

The interval for refreshments (arrangements for which were in the hands of Mr. A. E. Saville, catering manager, Marks and Spencer) was followed by a Brains Trust. Headed by Dr. N. C. Wright, the team consisted of Mr. A. L. Bacharach, Mr. H. J. Bunker, Mr. E. Capstick, Dr. J. B. M. Coppock, Mr. N. Goldenberg, Dr. D. W. Kent-Jones, and Mr. R. K. Sanders.

The questions, which brought out the humorous side of most of the members of the Trust, were provocative and varied. This was a feature which could well be included in future programmes.

The Food Group and the organisers of the conversazione must be congratulated on their latest success.

National Packaging Exposition

A selection of trade literature issued by exhibitors at the 1950 National Packaging Exposition which was held in Chicago in April last, is now available for loan to interested United Kingdom manufacturers in order of the receipt of their applications.

The literature covers the following goods:

> Machinery for carton and bag printing and making, box and carton glueing, carton and container making, photo-electric registration, code dating, etc.; printing rollers; wire stitchers; wrapping, weighing, counting, labelling, and bottle capping machines; bottle washing and cleaning machines; and canning machines.

Applications to inspect this literature should be made to the Board of Trade, Room 1094, Thames House North, Millbank, London, S.W.1. All requests for the loan of literature should specify clearly the type or types of goods in which the applicant is interested.

Sausage Prices

Emphasis on the need for an adjustment in the price of sausages was made at the annual dinner of the North Western Food Manufacturers' Association.

Mr. Frank Shire, President of the Food Manufacturers' Federation, London, remarked that those in the food trade found it hard to make a living but that the sausage industry was in a still worse plight.

The difficulties of all meat manufacturers were also stressed by Coun. George Moore, chairman of the Sausage Manufacturers' Association, who said that the prices allowed by the Ministry of Food for beef and pork sausages and all meat products at the present time were quite inequitable. Manufacturers did not like increasing prices, the effect of which was to impede trade, but in view of the conditions existing today and the continuing rise in price of articles used in the manufacture of meat products, the sausage makers should receive more recognition.

Vacuum Cold Plate Evaporators

Embodying an exclusive principle of heat transfer through contact of tubing and jacket, the Winget-Dole vacuum cold plate evaporator will be of interest to all concerned with processing, storage, and transport of products requiring refrigeration.

The plate, made in various standard sizes, consists of a pair of flat steel sheets welded together round the edges and having set between them a refrigerant coil. The tank so formed is hermetically sealed, the air within being exhausted to a high vacuum so that atmospheric pressure, evenly distributed over the outer surface of the sheets, presses them firmly in contact with the coil. The coil terminals project from the plate, enabling them to be connected to the source of refrigerant; several interconnected plates may be used in a single circuit.

The plates are flat on both sides and may be used as shelves, upon which products are placed for contact freezing, or as gravity air coolers—for instance in cold stores—by mounting them adjacent to walls or ceiling, or by suspending them on edge from the ceiling. They may also be installed against the walls or as divisions in refrigerated display cabinets. Defrosting is easily achieved by brushing or scraping.

The application of their plates to insulated vehicles and transport containers used for carrying products which need to be held at low temperatures during transit is described in a leaflet issued by the makers, Winget Limited. The plates for this purpose contain a hold-over medium which provides a "store of cold" for many hours between regenerating compressor operation.

Labelling Machines

Three models of their "World" labelling machines, capable of dealing with the fullest requirements of the brewer, wine and spirit bottler, or mineral water manufacturer, were shown by the Purdy Machinery Co. at the recent Brewers' and Allied Traders' Exhibition held at Olympia. One model is fitted to apply three labels simultaneously to a range of bottles and is equipped with a label stamping or dating attachment. Another, fully adjustable for a range of wine and spirit bottles, flasks, and quarts, is fitted with an all-over gumming attachment and mounted on a trolley.

Two examples of the junior machines in this range were shown, as well as fully automatic conveyor fed machines.

Optical Aids

Optical aids to the food manufacturer are now found in nearly all modern factories, both in the laboratory, and where the food is actually made.

Particular attention is paid by Bellingham and Stanley to the design of their instruments, so that they can be used not only by the chemist in charge, but also by unskilled labour. An example of this is the projection refractometer, which gives the sugar content of any jam in a few seconds. There are also a number of pocket refractometers available, covering different ranges of refractive index, to suit different industries.

A new instrument is the pan refractometer, which is attached directly to the vacuum pan, thus indicating the refractive index of the contents of the pan without taking samples at short intervals. Other new instruments, such as the contact refractometer and an experimental photo-electric instrument, are also under trial.

The company's polarimeters are being constantly improved, and various modifications made as suggested by users. Two models are made, the large one for research purposes, and the smaller one for use in ordinary routine control.

Industrial Lamp and Fittings

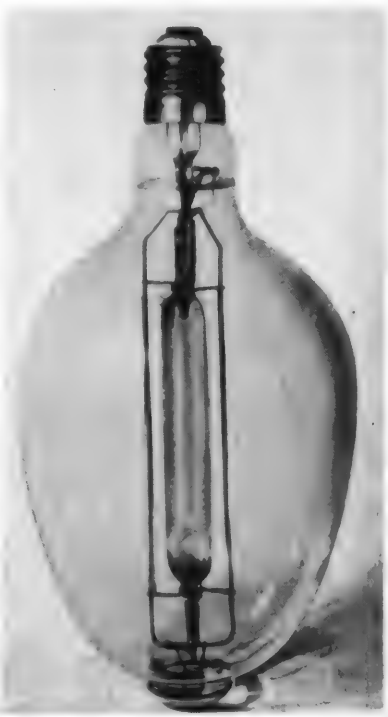
Hitherto the largest mercury lamp in general use for lighting industrial premises has been the 400 W. size, necessitating the use of a considerable number of light sources. The General Electric Co. has now developed a new Osram 1 kW. mercury lamp to enable the efficient lighting of such premises with a smaller number of lamps.

The new lamp has an average efficiency through life of 45 lumens per watt. Its average light output of 45,000 lumens is nearly twice as much as that of a standard 1,500 W. gas-filled tungsten lamp. It has an isothermal bulb, and is fitted with a G.E.S. cap.

Having an arc voltage of approximately 300, the lamp requires a mains supply of the order of 400 V. but this supply is normally available in industrial premises with three-phase mains. Two standard 400 W. chokes connected in series will provide the necessary stabilisation on 420 V. and above. A tapped choke to cover the full range of voltages from 350 to 450 is in preparation.

A high bay reflector fitting specially developed for the lamp consists of an anodised aluminium reflector mounted below a vitreous enamelled canopy with large ventilation slots, and carrying an auxiliary Saaflux type aluminium reflector cone and skeleton G.E.S. lampholder. A clip-on $\frac{1}{2}$ in. wire mesh guard is provided.

Some upward light is emitted through the ventilation slots, and deposition of dirt on the reflecting surfaces is retarded by the convection air stream. The reflector is detachable from the canopy for cleaning without disturbing the lamp.



Dairy and Ice Cream Equipment

A comprehensive range of artistically designed and printed waxed paper containers of various sizes for the packing of ice cream, cream, and other dairy products, including popular stock design containers for ice cream, was exhibited by The Gee Manufacturing Co. at the recent Dairy Show at Olympia.

Their display also included a varied selection of printed vegetable parchment, waxed and aluminium foil, and waxed linen papers for most food products. Specimens of high-class printed waxed paper containers for frozen foods were also shown.

*

The exhibits of The General Electric Co. comprised a display of sterilising equipment, including directly heated and thermal storage chests. There were also a storage steam raiser and a storage block steam raiser/water heater, while for those interested in a plentiful supply of hot water a dairy water heater was shown.

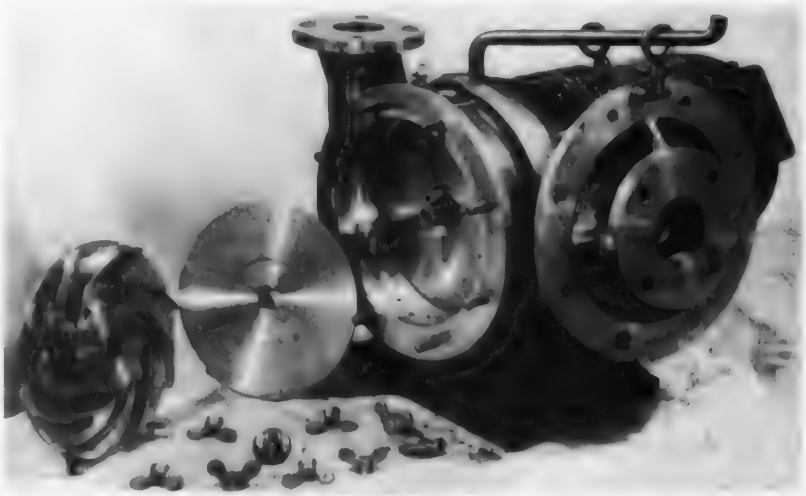
In the field of crop drying there was a range of the most modern equipment, including Aerofoil fans and air duct air heaters for drying grain in sacks or ventilated bins. Apparatus for barn hay drying was also on show, in addition to a 2½ cwt. double sack electric hoist and a pig farrowing heater.

*

A diaphragm valve with spannerless quick-release fittings and stainless steel parts was one of two new products of special interest to the food industry shown by the Saunders Valve Co. The union nuts are of knock-off pattern and the bonnet fastenings are slotted nuts for speedy removal. All these parts and the valve body are of stainless steel and the bonnet containing the mechanism is of aluminium. The valve diaphragm, which isolates the mechanism from pipeline contents, is of a reinforced, tasteless, flexible composition.

Safran pumps were represented by a stainless steel version of the self-contained Unishaft electric pump. Quick access to the impeller for daily sterilisation is provided by wing nut fastenings to the front cover. The impeller, which is split to ensure inner cleanliness, volute casing, end covers, and shaft are of stainless steel. Pumps with this hygienic specification can be supplied for independent or self-contained drive in eight sizes.

Other exhibits included a working sectional model of the Safran pump and examples of direct-coupled and belt-driven units. Quick-action and power-operated valves were shown and examples of glass and rubber-lined units prominently displayed.



One of the Unishaft centrifugal pumps arranged for dairy and kindred duties.
Photo Saunders Valve Co.

*

A representative range of Kathanode batteries for all traction duties was featured on the stand of The D.P. Battery Co.

These batteries are supplied for most makes of electric industrial trucks, delivery vans and floats, "prams," etc., and photographs displayed showed a wide selection of vehicles so powered engaged in the distribution of milk.

Stationary batteries for farm, dairy, and factory lighting were also shown together with emergency lighting equipment.

*

A complete water chilling installation for use with milk cooling equipment was included in the exhibits of G. and J. Weir. The 4 in. twin ammonia compressor discharges, through an oil separator, into an economiser condenser from which the liquid ammonia flow is regulated by a high-pressure float into the coils of the Baudelot cooler. Water for the milk cooler falls in a continuous spray over these coils and is circulated through the milk cooler at 35° F. Ammonia from the outlet side of the Baudelot cooler passes to a surge drum which prevents any liquid ammonia finding its way to the compressor suction.

Other compressors on show included 7 in. twin and 10 in. × 6 in. × 6 in. ammonia compressors, and two methyl chloride commercial units.

Also on view were a 200 gal./hr. homogeniser model with vertical spindle motor and worm gear drive, fitted with a two-stage homogenising valve for the occasion, three belt-driven models of smaller capacities, and a display of various types of valves used in the company's homogenisers.

Service for Bakeries

Established in 1946 with the primary function of conducting fundamental research and other scientific work in connexion with the baking industry, the British Baking Industries Research Association provides a number of technical day-to-day services, described in a booklet published for the information of firms who have not yet become members. In addition to receiving the publications and using the information service, members have the right to consult the Association on any scientific problem which affects their bakery business.

Produce Prepackaging

Strong, hygienic, and non-fogging window cartons that protect and preserve the contents from grower to consumer have been developed for the prepackaging of apples and pears in retail units by The Metal Box Company and British Celanese, using Clarifoil cellulose acetate film for the windows. The properties of the film allow the produce to "breathe" preventing condensation and fogging-up, and because no perforations are necessary, the packs are completely dirt- and dust-proof.

New Aluminium Rolling Mill

A NOTABLE BRITISH DEVELOPMENT

The 2,000 h.p. breaking-down mill at the beginning of the hot line.

Of several major schemes in the development of equipment and production methods in the aluminium industry of Great Britain, the first to go into production is Northern Aluminium Company's new continuous strip mill, which alone will increase the aluminium sheet capacity of the country by more than one-third. At a cost of three and a half million pounds, provision has been made for the fabrication of 50,000 tons of sheet and strip a year, which is half the peak production figure attained by all British plants together during the war.

The new plant at Rogerstone, near Newport, Monmouthshire, was opened on September 21, 1950, and challenges comparison with any of its kind in the world, both in efficiency and in total output.

During the period of transition from war to peace, prospects for the future of the industry were uncertain and it appeared that, if the aluminium industry were to maintain its hard-won position, it could be done only by using the most modern equipment and introducing a high degree of standardisation of product.

The new installation at Rogerstone consists of a continuous hot and cold rolling line for the manufacture of sheet and strip products. Laid down to the general specifications of the company's own engineers, and installed under their supervision, the new mill is now in operation and shows how these principles have been applied to a degree that will enable each man employed to produce about five times as much as his counterpart in earlier mills.

In carrying out the scheme, the company had before them the principle that if business were to be obtained in new and marginal markets, manufacturing costs must be reduced to the minimum. By curtailing drastically the range of commodities produced, and working exclusively on those for which there was a large and permanent demand, it was possible to choose equipment and lay it out for a high rate of production.

As Mr. Kenneth Hall, managing director, said in his speech on the opening day, as producers of semi-fabricated products, the company's primary function must be to try to serve the manufacturer of finished goods in Great Britain so that he may be in a position to compete in the world's markets.

In the export market the company is already responsible for roughly half the total aluminium exports of the U.K., amounting to some £4 million per annum, of which a substantial proportion is going to hard currency countries. In dollar markets, Great Britain has had to compete with the large and modern rolling mills built in the U.S.A. during the war. Given adequate supplies of aluminium at a reasonable price, this new mill will put the U.K. on an equal competitive footing with these.

In giving his blessing to the new enterprise, the Rt. Hon. G. R. Strauss, M.P., spoke of the long tradition of happy relations that had existed between his Ministry and the Aluminium Company of Canada, who supplied a greater part of the virgin aluminium fabricated in the U.K.

The new plant, with Canada for its parents, with British machines and British workmen, is "a new link forged in our great Commonwealth of Nations."

Pre-war Favourites Return

To mark the reintroduction of two pre-war products—a fruit and a brown loaf—Procea Products recently held a reception at the Waldorf Hotel when guests were invited to sample sandwiches and other dishes based on the company's range of bread.

Mr. Slevin, the sales controller, pointed out how a larger and lighter loaf was obtained by the addition of gluten, extracted from Canadian flour at the company's factories. The lightness of the loaf made it more easily digestible, while its greater size offset the difference in price as compared with the National loaf. He emphasised its superior keeping qualities and consequent lack of waste which made the bread particularly valuable for use in industrial areas.

Firms Aid Thanksgiving Fund

As their share in the nation's "Thank You" to the Commonwealth and U.S.A. for their £80 million worth of food gifts, the Edinburgh firm of United Biscuits, and Field and Co., fruit merchants, have sent £105 and £100 respectively to the Lord Mayor of London for the National Thanksgiving Fund.

Latest figures show that the Lord Mayor has received over £680,000, apart from money being raised by local authorities throughout the country.

Gas Appliances for Brewers

How the use of gas and coke appliances helps to give the public house and the hotel the warmth needed for comfort, and the cleanliness necessary for hygiene, was the theme of the Gas Council stand at the recent Brewers' Exhibition.

Exhibits included the latest type of gas-fired overhead heaters, as well as other types of gas and coke fires. Special emphasis was placed on the use of gas-fired water-heating appliances to ensure cleanliness and hygiene.

The use of gas in large-scale water-heating and in the preparation, brewing, storage, and distribution of liquor was also illustrated.

Food Factory Plans

Approval has been accorded to plans for the extension of the factory of Eclipse Candy Co. at Cow Lane, Salford.

*

Plans to extend their premises have been drawn up by Aircraft Brand Mineral Water Manufacturing Co.

*

The erection of a new factory at Cardiff is proposed by Soya Foods.

*

Work is to begin this month on the conversion of premises at West Chirton Estate, North Shields, into a factory for Welch and Sons, confectionery manufacturers.

*

Factory extensions are planned by Symbol Biscuits of Devonshire Road, Blackpool.

*

To meet the increasing demand for their products, large extensions to their fitting and erecting shops, in addition to an increase in their machine-tool capacity in order to balance production, have recently been made by Robert Kellie and Sons, manufacturers of plant and machinery for the food industries.

Marshall Aid for British Sugar

By means of the Marshall Aid scheme, British firms have been enabled to resume or continue the purchase of essential machinery from the dollar countries in order to increase production and efficiency.

One such firm is the British Sugar Corporation, who recently purchased slicing knives for one of their beet cutting machines and an accompanying sharpening machine from Henry Disston and Son, Inc., Tacony, Philadelphia. The knives are used in the beet-cutting operation and are slipped into knife-blocks, which in turn are fitted into the circular disc of the beet-cutting machine. They have to be sharpened after four hours' use by means of a special machine.

These parts were installed for testing at the Bury St. Edmunds factory of the Corporation which holds the world's record for beet cut in one campaign. During the last beet campaign when they were used, the knives proved most successful in the slicing of the beet into finer cosettes, thus yielding a greater sugar extraction. It is hoped to make a greater test this year which will probably result in further installation of these improved knives.

Heavy Transport

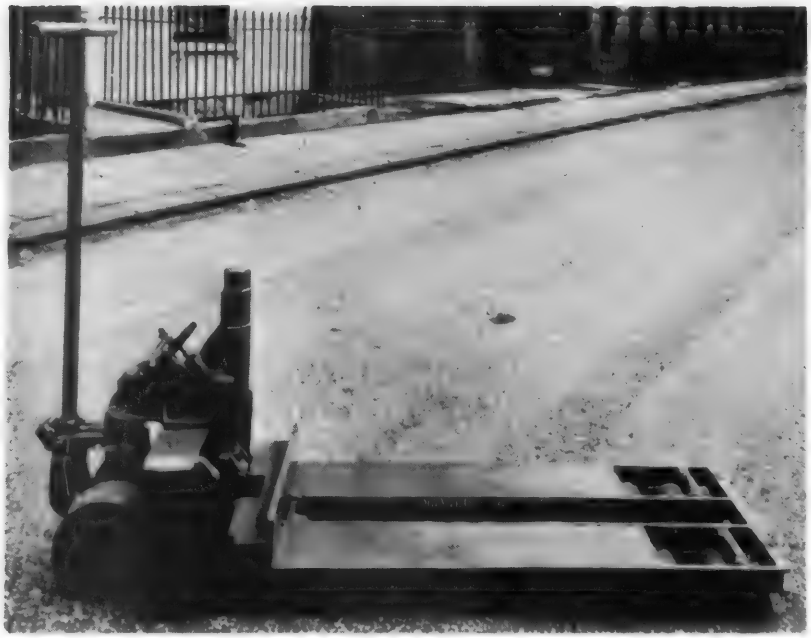
With its ability to carry loads up to 7 tons for the rigid models and 10 tons for the articulated semi-trailer models, the Big Bedford, a new British truck designed by Vauxhall Motors, sets a new standard in payload/unladen weight ratio, the standard lorry and tipper both carrying a full 7 ton payload, yet having an unladen weight of under 3 tons, so that they can travel at 30 m.p.h. on British roads.

Produced in four standard chassis types, the Big Bedfords are full forward control models, which provide maximum loading space in relation to total length and equal tyre loadings front and rear with twin rear tyre equipment. Body cross-members are mounted direct to the frame, without the usual longitudinal bearers.

The completely new 300 cu. in. engine develops 110 b.h.p. at 3,200 r.p.m. The four-speed gearbox has synchromesh on second, third, and top. Constant mesh second and third gears are helically cut to reduce noise level in the all-steel full forward cab.

With standard seating for two and optional seating for three, the cab is insulated from the heat of the engine by a double-skinned engine cowl, through which a stream of cool air is passed by the engine fan while the engine is running. Removable panels and hinged cowl give easy access to the engine for routine servicing.

Operating the sharpening machine, with slicing knives on the shelf above.



Industrial truck with a two ton capacity.

Mechanical Handling Problems

Industrial trucks are available in many types and designs, but there is always the special problem in internal transport which standard equipment cannot solve. In one such case handled by J. Collis and Sons the capacity required was 2 tons; the lowered height of the truck had to be not more than 4 in., and the height of lift only 1¾ in. There was no room to incorporate the large high loading capacity rear wheels, neither could the normal rod lifting mechanism be used.

The problem was solved by recessing small articulating wheels in tandem in each of the side members of the lifting frame. Fitted with strong roller bearings, these wheels took the load with ease. The base of the ram in the hydraulic unit was connected to a stout roller chain riding over a guide block and connecting with the lifting frame, thus dispensing with the more usual rod and base bar mechanism.

Among several other new mechanical handling models devised by the firm to meet specific requirements is a conveyor for carrying objects of a longitudinal nature. This type of gravity roller conveyor, known as the Diabolo Rola Veyor, was in this case designed to operate as a permanent fixture bolted to the floor, and was made from solid steel rollers and straight side sections.

Combining two major adaptations from the standard models, the firm's stacker telescopic model has fork lift arms in place of the normal table, and its load is compensated by the counterbalancing achieved by stepping back the power unit from its normal position. This model, which is hydraulically and electrically operated, is particularly useful for purposes of stacking and storing in restricted spaces.

Quick Frozen Kipper Exports

The export of quick frozen kippers to the U.S.A. promises to be successful, although the plan has come to a temporary stop on the production side owing to a deterioration of the quality of the current catch. The "Queen of Scots" pack will be developed steadily in the U.S.A.; present plans visualise a major expansion of the export target for 1951, and an appeal has been made to kippering firms in north-west Scotland—where the quality and size of the fish make them particularly suitable for this scheme—to expand their production facilities for next season.

Care is being taken to ensure that fish sent under this scheme comply with rigid quality standards. It has been contended, however, from some areas that the price offered is not an economic one unless the quality of catch and the size of the fish are continuously good; such a qualification cannot be guaranteed in most areas, which means that some sections will not be able to join in the scheme.

Works Councils in Action

The Bournville men's and women's works councils have been in existence since 1918, and a recent booklet issued under the title *A Works Council in Action* deals exhaustively with their formation, constitution, and organisation. Those who may be contemplating starting a works council of a similar nature will find this an invaluable guide; and those who may be finding the running of a council rather "heavy weather" will discover in this booklet many ideas that have been tried out and found to be practicable.

Packing Room Aids

Specialists in the manufacture and supply of tensional steel strapping equipment and packing room ancillaries for over 25 years, Boabands provide a system, tools, and material for dealing with packages ranging from the small post parcel to cases or crates weighing many tons.

Aids for the packing room range from a rotary packing table to a patent metal strap cutter, and specialities include systems for cases, cartons, bundles, bars, rods, and coils, as well as wire cutters, and shears.

All equipment is overhauled and repaired free of charge, and the services of the company's technical and research department are available to clients.

Commercial London

The wide variety of work carried out by the London Chamber of Commerce is evident from a study of the 68th annual report, covering their activities during 1949.

Some 110,000 enquiries were dealt with by the Customs and Regulations, and Statistics and Enquiries Departments, while the number of certificates of origin issued was 95,000, compared with 75,000 in 1948.

The Chamber was invited by the L.C.C. to co-operate in the preparation of the County of London Development Plan, and there is also a record of the Chamber's work in co-ordinating the efforts of the many organisations seeking to combat theft and pilferage.

In accordance with the wishes of the Government, the Polish Commercial Creditor's Committee set up by the Chamber undertook negotiations on behalf of British claimants having outstanding pre-war commercial debts due from Poland.

Lighting for Biscuit Manufacture

A new lighting installation has recently been introduced at the London biscuit factory of Peek Frean and Co.

To obviate any possibility of flaking paint or enamel dropping on to the foodstuff in preparation, and at the same time using fittings least liable to infestation, 148 Metrovick "Perspex" 5 ft. fluorescent trough fittings were selected by Mr. G. W. Davies, the chief engineer of the factory. These with additional 5 ft. angle units along the walls form the general lighting.

Three conveyors are lighted by 5 ft. fluorescent lamps in continuous troughs designed for easy maintenance and fitted with transparent covers to prevent any possible risk of glass, etc., falling on to the biscuits. These troughs are especially shallow to enable the operators' hands to work between the unit and the conveyor, and as the units are below the eye level, the operatives work under adequate and comfortable seeing conditions.

In the machine room where the dough is laid and the biscuits punched and formed before going into the ovens, it was stipulated that the exposed parts of the machines as well as the unbaked biscuits should be evenly illuminated. The rooms are narrow and the machines high, but entirely satisfactory results have been obtained by using 57 5 ft. fluorescent lamps in angle reflectors with curved transparent covers.

Cheaper Peas Needed

At the third post-war annual sales conference held by Batchelors Peas at Southport from September 6 to 8, keen disappointment was expressed by Lt.-Col. M. W. Batchelor, J.P., in his address that, although the production of tinplate was still only 75 per cent. of the pre-war level, much of it was being sent abroad. This often returned to Great Britain in the form of cans containing fruits and vegetables, and he thought that this could bring real harm to the United Kingdom canning industry.

He also mentioned the public enquiry regarding the efforts of English growers to introduce a peas marketing scheme and questioned what would be the position in respect of the scheme were imports of Dutch peas to be permitted. The main point, he said, was to get cheaper peas so that the public could benefit, and not necessarily to control the availability of them.

Metrovick lighting in the factory of Peek Frean and Co.

Appointments

Mr. F. Stanley Morris, senior partner in the firm of Hodgson, Morris and Co., chartered accountants, of Liverpool, has been appointed a director of Reynolds Brothers, sugar cane growers and millers of Natal, South Africa.

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Mr. H. A. R. Binney, C.B., an under-secretary of the Board of Trade, has been appointed deputy director of the British Standards Institution.

▪

Mr. W. S. Steel, B.Sc.(Eng.), M.I.E.E., A.M.Inst.Mar.E., has been elected a director of The British Thomson-Houston Co.

Bread Cooling System

Dough retardation for production of "smalls" and new bread cooling systems are attracting the interest of the baking industry. The adoption of large-scale slicing and wrapping demands a faster production routine than has been operated to date with rapid cooling of bread as it emerges from the ovens. The United Co-operative Baking Society in Glasgow who are operating a highly successful plant of this type, and who are probably the first in Great Britain to use the method, are developing plans for the expanded use of this system.

The large factory bakeries are reluctant to disclose their plans, but a number of dough retardation plants (for "smalls") and at least one major cooling chamber scheme (for loaf bread) are now in process of design or construction.

East Malling A.G.M.

The thirtieth annual general meeting of the East Malling Research Station was held at Bradbourne House during the morning of September 26. The chairman, Mr. Tom Neame, referred to the difficulties that the National Fruit Trials Committee were experiencing in finding a suitable site for the Trials, and he appealed to members to let him know of any suitable properties.

The director, Dr. F. R. Tubbs, in presenting the annual reports of the Station for 1949, dealt particularly with Section II of the research report and drew attention to the wide programme of work in progress. He referred to the problems of laboratory accommodation and land that were being raised by the greatly increased staff, and to the large number of outside activities now being undertaken, including assistance with the planning of some of the new horticultural stations. The attendance of members at the Members' Days arranged during the year was most encouraging and Dr. Tubbs commented on the general co-operation between the N.A.A.S., the Research Station, and its members.

After a buffet lunch at the laboratories, the members were conducted round some of the plantations to hear about work on codling moth, brown rot, and walnuts.

Each of the speakers during the afternoon had to deal with a varied selection of questions. Tea served in the Station's canteen and packhouse brought the proceedings to a close.

Measuring Electrostatic Charges

Electrostatic charges are readily acquired by friction arising during manufacture on the surfaces of materials of low electrical conductivity such as paper, belting, and plastics. In order to investigate such conditions, and to assess the effectiveness of measures taken to obviate them, a portable instrument capable of measuring electrostatic charges was developed by the research division of the Dunlop Rubber Co.

Recent developments in subminiature electrometer valves, and other components have enabled the Baldwin Instrument Co. to redesign and develop this instrument into a robust and convenient form for general laboratory and workshop use.

Known as the Baldwin-Dunlop Statigun, the instrument consists of a pistol-like body and grip which contains the batteries, switches, and adjusting rheostats, and the indicating instrument. A detachable cylindrical part corresponding to the pistol barrel contains the hermetically-sealed electrometer valve, the capacitance coupling plate, a gravity-operated setting switch, and a sliding member controlling the sensitivity.

The instrument thus measures voltage gradients and discriminates between fixed positive and negative potentials and alternating potentials. Accessories enable the instrument to be used for the measurement of charge and of the resistance to earth or to an adjacent point of the object being investigated.

The instrument is switched on by pulling and holding the trigger switch; the valve heats up in a few seconds.

The heater and bias voltages are then adjusted in accordance with the operating instruments and the instrument pointed at the object on which the charge is to be measured. The position of the sensitivity sleeve may have to be set to bring the reading within the scale. This sleeve has three positions giving X1, X10, and X100 times the instrument scale reading.

The voltage on the surface at which the instrument is pointed is then given by multiplying the scale reading by the sensitivity factor and by the separations in feet between the object and the instrument.

Trucks for Food Factories

Particularly suitable for the food industry, the electrical industrial trucks and fork trucks manufactured by Wingrove and Rogers are clean, silent, and fumeless.

The main types in current production are fixed platform trucks, 1 and 2 ton elevating platform trucks, 5 ton tractors, and 15 cwt. to 2 ton high lift fork trucks.

Anniversary of Radium Discovery

At the celebration of the 50th anniversary of the discovery of radium held in Paris from July 16 to 20, Professor F. A. Paneth, representing the Chemical Society, gave an address at the opening ceremony in the name of all the delegates from overseas.

He conveyed to the organising committee their sincere greetings on the occasion, and recalled with pleasure that Marie Curie was elected an Honorary Fellow of the Chemical Society in 1904.

Changes in Oil Processing

The continued high prices which vegetable oils command on the world market and the increased home demands for high quality products is bringing about great changes in the vegetable oil processing technique. Mr. M. K. Schwitzer of Bamag, who recently returned from a visit to Iran, where he studied problems arising out of the progressing industrialisation of the country, has been able to form an accurate opinion of recent trends in the industry.

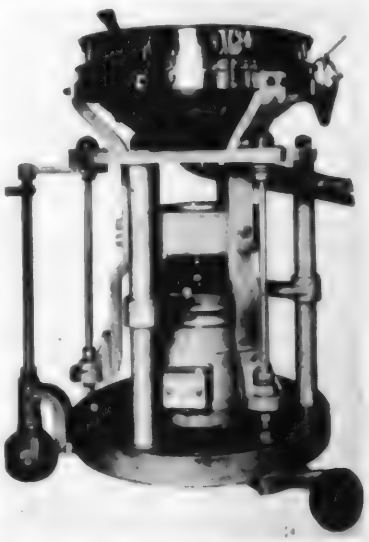
At the request of vegetable oil interests, Mr. Schwitzer also spent some time in Turkey and in other Mediterranean countries.

Sieving and Straining

Small, silent running, and mobile (being mounted on trolley wheels), the Finex sieving and straining machine ensures the efficient removal of all impurities in food products. All contact parts are of polished stainless steel, readily removable and easy to clean; the patent sieving element itself can be completely dismantled and remeshed in a few minutes.

Liquid or solid materials can be processed through the finest meshes (such as 250) giving substantial outputs, and either metal or silk mesh can be employed, the latter being of particular advantage when finely ground protein materials are being handled.

Manufactured by Russell Constructions, the machine is powered by a special waterproof electric motor of ½ h.p., so that current consumption is negligible.



Sieving and straining machine.

Retirements

Mr. J. S. Ramsden, M.I.E.E., has resigned from the board of directors of the British Thomson-Houston Co., after more than forty years' service with the company.

Mr. Ramsden is, however, remaining with the company in a consultative capacity, and is retaining his seat on the boards of The British Thomson-Houston Export Co., Ferguson Pailin, and the Switchgear Testing Co.

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Mr. E. B. Piggott has resigned from the position of secretary of Newman Industries for health reasons. Mr. Charles Bush has been appointed to succeed him.

Changes of Address

As from August 28, 1950, all communications for the British Food Manufacturing Industries Research Association should be sent to their new premises at Randalls Road, Leatherhead, Surrey. Telephone: Leatherhead 4124 (three lines).

*

The address of B.V.C. Industrial Constructions, a subsidiary of The British Vacuum Cleaner and Engineering Co., is now: Terminal House, 52, Grosvenor Gardens, London, S.W.1.

New export showrooms of the parent company have also been opened at these premises for the permanent display of a representative selection of their products. The showrooms are open from 9.30 a.m. to 5.30 p.m., Monday to Friday; any enquiries will be attended to by the company's export staff on the premises.

Cone and Wafer Prices

To compensate manufacturers of cones and wafers for the recent considerable increase in the amount of the flour levy which all biscuit manufacturers have to pay on the flour they use, the Ministry of Food has increased the maximum prices of cones and wafers by 7½ per cent., with effect as from September 10.

Nevertheless, manufacturers are making less profit because the increase is insufficient to compensate them fully for the extra charge on flour which they have to bear.

There has been no increase in the prices of wafers and cones since August, 1946, although since that time costs of raw materials, packaging materials, distribution, labour, and other manufacturing items have risen considerably.

Business Trip to Canada

Mr. Leslie Gamage, vice-chairman and joint managing director of The General Electric Company, recently made a five weeks' business trip to Canada, including visits to Quebec, Montreal, and Vancouver. His visit culminated in an address to The Canadian Club, Montreal, on "Britain's Industrial Recovery" which was broadcast throughout Canada.

Stainless Steel Food Plant

The use of stainless steel equipment in the food and drink industry is the subject of a brochure recently issued by Metal Propellers. Illustrated throughout, the publication gives details of plant for the brewing and distilling, milk and ice cream, fruit juices and cordials, and pickles, sauces, and preserves industries. Heating and cooling coils and condensers, standard portable containers, tanks and storage vessels, and jacketed pans made by the firm are also described.

Food from Czechoslovakia

Considerable interest was shown by food manufacturers in the Czechoslovakian foodstuffs displayed by Centrokomise of Prague at the recent British Food Fair. Tomato purée of 28 to 30 per cent. concentration, dried sliced mushrooms, bilberry pulp, sweet red paprika, and fruit juices and syrups were shown by the company, who are the sole exporters of foodstuffs from Czechoslovakia. Their London representatives are the Minerval Produce Co.

Allocation of Government Factory

The surplus Government factory at Clayton-le-Moors, Accrington, has been allocated to the English Electric Company for light engineering and the manufacture of electrical equipment.

The factory is at present occupied by Courtaulds, who, owing to reorganisation, are giving it up. It is the intention of the English Electric Co. to absorb the existing labour force.

Scribbans-Kemp Limited

CONSIDERABLE DEVELOPMENT

The 23rd annual general meeting of Scribbans-Kemp, Ltd., was held on September 20 in London, Mr. H. Oliver-King (chairman and managing director) presiding.

The following are extracts from his circulated statement:

The year has been a particularly difficult one, in that the raw materials available for manufacture have been considerably limited, and also there has been a constant rise in expenses.

Packaging, transport, and wages in particular have risen considerably during the year, and these items apply not only to the manufacture of cake and biscuits, but to the other various activities in which your company is engaged, and shareholders will appreciate that while raw materials are limited, it is not possible to expand the manufacturing side of our interests to a very large extent.

In spite of these difficulties it is satisfactory to be able to report to you that the trading profits of the group are slightly ahead of last year at £1,597,492, though, due to the expenses aforementioned, the net profit is slightly down.

During the year we have successfully established companies in South Africa, Canada, and U.S.A.

Your company have acquired on satisfactory terms the whole of the share capital of the old-established biscuit manufacturing company of Wyllie Barr and Ross, Ltd., of Glasgow, and I am able to report that trading since its acquisition has been satisfactory.

During the year there has been some considerable development on the retail side, chiefly with Meesons, Ltd., the number of retail sweet shops having been more than doubled during the last five years.

In the last report I dealt with the present capital structure and the possible need for additional capital. I very much regret that these plans are not yet ready but I have hopes that within a short while proposals will be laid before you.

Total reserves amount to £4,068,208, making a substantial reserve position.

Current assets at £8,087,725 show a balance of £2,121,365 over the current liabilities and provisions.

Since the end of the financial year there has been some slight recession of trade and evidence that the spending power of the public is somewhat restricted, which may show itself in next year's accounts.

The report was adopted.

BOOKLETS RECEIVED

A complete range of polished stainless steel pipe fittings for the dairy, food, and beverage industries is described in a new catalogue issued by the A.P.V. Company. The fittings are made to withstand rough handling, can be quickly disconnected and reassembled, and are of simple design so as to facilitate sterilisation. Also published by the company is a leaflet on their stainless steel measuring can filler which fills without foaming, measures accurately, operates swiftly, and completely eliminates waste.

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Entitled *Foodstuffs*, the latest booklet published by the Purchasing Officers' Association in their Raw Material Survey series covers the commodities milk, meat, sugar, tea, coffee, and cocoa.

In order to provide a background of knowledge to supplement the information regarding specific raw materials published in this series, the Association have produced *The Economic Background to Purchasing*, which deals mainly with Britain's external economy, and assists the reader to gain an insight into some of the country's post-war economic problems.

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Designed to overcome fading from ultra-violet light, a new tough, dimensionally stable, humidity and damp resisting film is available for packaging light-sensitive products where a transparent container is needed (*Packaging Abstracts*, 7, 6, 1950). Tests have shown that there was no more lead in the contents of cans soldered with an alloy of 2 per cent. tin and 98 per cent. lead than in those soldered with a 33 per cent. tin alloy, and the presence of a tin covering decreases the danger of lead being dissolved by some foodstuffs.

Tomatoes, asparagus, celery, dates, apples, pickles and sauces, fruit syrup, ghee, and wine are among the special products in the packaging of which there have recently been important developments.

Company News

At a recent board meeting of L. Rose and Co., an interim dividend was declared on the ordinary shares of the company for the year ending December 31, 1950, payable on October 31, 1950, at the rate of 5 per cent. actual, less income tax at 9s. in the pound.

OBITER DICTA

- Hors d'oeuvre: violet and orange sludge.—*Dr. Mario Praz describing part of his first post-war meal in London in Rome's "Il Tempo."*
- A condiment is the staircase to a meal, but the mushroom is an escalator which carries us gloriously through the meal.—*M. Andre Simon, President of the Food and Wine Society.*
- Thirty-one Africans accused of murder were alleged to have formed village defence squads to save their women and children from being "canned as corned beef for export.—*"The Times."*
- The Ministry of Food has imported everything in its time from frozen Australian goats to Argentine "tombstones," which were over-fat, frozen blocks of inedible meat.—*Bruce Blunt in the "Daily Express."*
- Kongwa becomes more like England every day. After cinema shows patrons can now call in Chez Suzanne (the old ice cream parlour) for a fish and chip supper before going home.—*"Our World," Sept., 1950.*
- I have no wish to live in a fool's paradise of pretty coloured wrappers. Contaminated foodstuffs are not rendered safe by artistic packaging.—*Mr. Morley Parry, food hygiene officer of the Ministry of Food.*
- It may be worth recording for those in charge of international conferences that fish-balls are the most internationally popular fish dish.—*Capt. John Giaver, leader of the Joint Anglo-Scandinavian Antarctic Expedition.*
- When you get a lot of young people together feeling ill after a meal, they think of the number of people they have read about in the Press who have died from food poisoning, and consequently you get a lot of anxiety.—*Dr. E. Moir, deputy medical officer of Health, Stockport.*
- Why on earth a pretty young girl thinks it necessary to plaster herself with lipstick, as did her ancestors centuries ago, I can never understand, but I am sure there is no need for them to do as they are doing and leave their ornamentation on cups which occasionally get back to another customer.—*Alderman F. C. Whittaker, Deputy Mayor of Scarborough.*

At the ordinary general meeting of Thos. W. Ward held on October 27, a final dividend of 10 per cent., less tax, on the ordinary share capital of the company was recommended, making, with the interim dividend of 5 per cent., less tax, already paid, 15 per cent., less tax, for the year ended June 30, 1950.

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The usual final dividend of 20 per cent. with a cash bonus of 5 per cent., less tax, making—with the interim dividend of 7½ per cent. already paid—a total of 32½ per cent., was recommended by the directors at the twenty-first ordinary general meeting of Smith's Potato Crisps (1929), Ltd.

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The policy of removing restrictions was "too timid and too slow," said Mr. Harry Salmon, chairman of J. Lyons and Company, at the recent annual meeting. Neither could the system of bulk buying be justified on economic or commercial grounds; it was responsible for the poor quality of much of their raw material.

A final dividend of 3s. 6d. per £1 unit on ordinary and "A" ordinary stocks (making 4s. 6d. per £1 unit for the year), and a final dividend of 8·4d. per £1 unit or share respectively on the proportional profit stock and "B" proportional profit shares (making 10·8d. per unit or share for the year) were recommended.

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The past year had been a difficult one for the food industry, and although the home sales of the company's subsidiaries had shown an overall decrease of less than 2½ per cent. on those for the previous year, home profits had fallen appreciably, it was stated by the directors of Beecham Food Products in their report for the year ended March 31, 1950.

This fall in profits was largely attributable to the manufacturing companies of the Group; the directors had already initiated a policy of concentration of manufacturing activities and, to a more limited extent, of the wholesale distribution operations of the Group, and substantial economies were expected to be effected during the coming year. In accordance with this policy, two of the company's subsidiaries, Purnell's Food Products and R. W. Holden, had been placed in voluntary liquidation, the business of both being taken over by C. and E. Morton.

World Food News

Canned Meat Study

Mr. Joseph Kelly and Mr. Timothy Lynch, veterinary officers attached to the Department of Agriculture in the Republic of Ireland, recently left Dublin on a two months' tour of Europe during which they are studying the canned meat industry in France, Belgium, Holland, Sweden, and Denmark.

Copenhagen International Fair

Owing to the demand for space, the Copenhagen International Fair will be split up into two sections; the Technical Fair will be held from February 9 to 18 and the Commercial Fair from March 2 to 11, 1951.

United Kingdom firms contemplating participation may wish to enquire about the current Danish import licensing position on the goods which they propose to exhibit. Enquiries on this point should be addressed to Tariff Section, Commercial Relations and Exports Department (Industries Branch), Thames House North, London, S.W.1. Telephone: Victoria 9040, Extension 3036.

Food Developments in Australia

The building at Port Melbourne of one of the largest mills in the Southern Hemisphere and the installation of modern packaging equipment in factories owned by the company are being undertaken by Robert Harper and Co. of Melbourne.

The company recently became the leading shareholder in Echuca Milling Pty., a company formed to mill rice grown in the Murray Valley district. Production of rice in this area has been increased greatly during the past few years. A similar project, in which the company is also interested, will be established at Whitton in the Murrumbidgee irrigation area.

Belgian Congo Margarine Plant

The Belgian Congo's first margarine factory, situated at Leopoldville, has started operations. It has a capacity of 20 tons of margarine and 15 tons of household soap per day, all raw materials being obtained from the Congo.

The plant will soon start the pressing of oilseeds and manufacture of toilet soap and soap powder.

Sugar Refinery for Venezuela

A new sugar refining company, going into production in the El Turbio area, near Barquisimeto, in Western Venezuela, will produce some 3,000 tons of sugar from approximately 1,700 acres of cane, and is expected to meet up to 10 per cent. of the national sugar shortage.

The company is affiliated to the National Association of Sugar Cane Growers, whose President believes it will take five years to cover the country's sugar shortage.

Photo The Dow Chemical Co.

Storage Containers for Food

Produced in sets of four, Refresher boxes have been made in plastic for refrigerator storage of butter, eggs, meat, fish, vegetables, and fruit. Fruit and vegetables stored in them remain crisper if a paper towel is placed in the bottom of the box to absorb moisture. Other uses are as a freezer for pudding and ice creams and for preserving sandwiches made the day before.

Designed by Ruzak Industries in plastic produced by the Dow Chemical Company, the round box of the series may be used as a cake or biscuit jar; it also provides excellent storage for cheese, which will stay fresh for a long period if the proper solution of salt, water, and vinegar is placed in the box.

Obituary

Mr. W. F. R. Murrie, President of the Hershey Chocolate Corporation from 1908 to 1947.

Mr. Murrie was the first President of the Cocoa and Chocolate Manufacturers' Association of the United States of America and served in that capacity until his retirement. In addition he became a director of many corporations, not limited to the chocolate industry.

Irish Cheese Campaign

A campaign to make the Irish "cheese conscious" and to develop export markets has been started by Mitchelstown Creameries, Tipperary.

Over 8,000 tons of cheese are manufactured at Mitchelstown annually, and 1,000 tons are exported—mostly to Britain.

A speciality is an Irish Gruyère modelled on the Swiss variety and marketed in colourful circular boxes, each containing six triangular 1 oz. portions wrapped in tinfoil.

Known as "Whitethorn," the cheese is made from sweet cow's milk; it is allowed to mature for five months and is then processed. Cream is added to the Gruyère base to make a spreadable cheese named "Three Counties."

Cheddar, sold in large blocks, is also made at Mitchelstown, as well as a processed Cheddar called "Galtee," which is retailed in a manner similar to the processed Gruyère.

Swiss and German machinery of the most up-to-date type has been installed in the factory where five hundred people are employed, but the high quality of the cheese produced there is mainly attributable to the skill of the workers and to the processing methods employed. The factory is set in some of Ireland's greatest dairying country, called the Golden Vale, and the milk is obtained from the company's and from local herds.

Whey, a by-product of the cheese-making industry, feeds 4,000 pigs on the Creameries' experimental farm nearby, which also accommodates a herd of prize Friesian cattle.

Grain Elevator for Israel

The largest grain elevator in the Middle East is at present under construction in Haifa, Israel. All the machinery and installations required are being supplied by the Swiss firm of Bühler Brothers, Uzwil.

Experiments in Beef Transport Methods

PIONEER WORK IN AUSTRALIA

While rail transport is still the best method of moving large numbers of cattle over long distances, the promise of a guaranteed market in the United Kingdom is leading cattle interests in Australia to experiment in other methods of transport, such as road trains carrying live cattle and transport aircraft carrying chilled meat.

At present beef cattle fattened in Northern Australia are driven to coastal killing centres where they arrive as stores requiring a further season to regain condition. Although railways have proved the best method of transporting cattle over long distances, it is unlikely that railway development on an adequate scale could ever be an economic proposition.

As part of its efforts to expand meat exports to the United Kingdom over the next fifteen years, the Commonwealth Government has decided to make new roads in Northern Australia, and work to cost £1·5 million has already commenced.

This development lends more point to recent experiments on road transport of cattle by means of road trains and experiments to test their practicability (described in the *Bank of New South Wales Review*, 1, 1950) have been initiated by the Australian Meat Board.

Another approach to the problem is that of air-freighting freshly killed carcasses, chilled on the stations, to freezing works at railheads or on the coast. Air freight experts claim that although air running costs are higher, when the relative capital outlay is considered air transport is more economical than transport by either road or rail for areas in Northern Australia where formed roads or railways do not exist.

Further work will be necessary before it will be possible to assess the permanent economic value of road and air transport of beef. Both methods require fairly heavy capital investment either in vehicles and roads, or in aircraft and chilling facilities. Neither method is likely to supersede use of railways or droving for large numbers, but they could become important adjuncts in providing feeder services and earlier killing of fat cattle.

Illumination for Laboratory Work

Users of microscopes will be interested in a new light for transparent specimen work. Using an ordinary 40 watt lamp, the light is provided with louvres on the top and bottom permitting a flow of air around the lamp. The pressure controlled ball and socket joint allows the light to be focused in any direction. The condensing lens is of the bull's eye type with one surface ground to provide evenly diffused illumination. Above this lens is an anti-glare shield which protects the user's eyes.

Manufactured by Bausch and Lomb, the lamp is fitted with a base heavy enough to prevent tipping over and has four felt-padded feet to protect table tops.

Metal Shortage for Food Canning

Because mills are not yet producing the appropriate grades of sheets, the Austrian food canning industry is changing over from tin to glass and cardboard containers. Sheets imported under ERP are mainly destined for the motor vehicle industry.

India Experiments with Wheat

Floods and drought will no longer affect the sowing of wheat in India if the experiments carried out in a laboratory in Uttar Pradesh prove successful.

Vernalised wheat seeds, produced at the laboratory, can be transplanted when field conditions are favourable and a successful crop can be grown, thus enabling the cultivator to choose his own time for sowing the wheat.

Irish Blackberry Pulp

Because of the British jam manufacturers' decision not to import their customary 5,000 tons of Irish blackberry pulp this year, Ireland lost a £200,000 market.

According to one source of information, the reason for this decision was that there was now no demand for bramble jelly in British homes, and, in addition, manufacturers could buy plentiful supplies of other soft fruits at reasonable prices.

Only relatively small quantities of bramble jelly are manufactured in Ireland.

S. Africa Alters Food Regulations

The Department of Health in South Africa intends making amendments to the Food and Drugs Act in respect of canned meat and fish products. Among the proposed amendments are clauses setting new standards for the meat and fat contents of sausages and other meat products.

Suggestions and criticisms in regard to these proposed regulations may be sent by interested persons to reach the Secretary for Health not later than November 25.

If these regulations are brought into effect, they will apply to imported goods. In past years the entry of consignments of meat products at South African ports was often prohibited on account of their deficiency in meat content.

Fruit Growing in Holland

The Netherlands Fruit Growers' Organisation has declared itself against extension of fruit growing in Holland. In the opinion of the Organisation, an extension of the area under fruit, which has increased by about 87,500 acres during the past ten years, would result in a considerable surplus and low prices. With the exception of soft fruit, peaches, grapes, and other products grown under glass, yearly production of fruit such as apples, pears, plums, and cherries, is estimated at 1,100 million lb., 60 per cent. of which can be sold on the home market.

During the past ten years, production was increased by 440 million lb., and the Fruit Growers' Organisation estimates that in 1960 yearly production will not be far from 1,540 million lb., as thousands of acres are planted with young trees which are not yet bearing fruit.

The Organisation emphasises that home consumption of fruit could be raised considerably if the fruit processing industry were extended and "eat more fruit" propaganda intensified. At the present time, average *per capita* consumption amounts to about 66 lb., most of which is eaten in August and the autumn months. From January until June no more than 2 lb. of fruit is available per person per month. Prospects would be fairly favourable if fruit stored for months of relative scarcity could be sold at profitable prices. It is not believed, however, that purchasing power will be high enough to enable people to buy fruit extensively in winter and early spring.

OVERSEAS ENQUIRIES

Salt Grinding Machines

The United Kingdom Trade Commissioner at Wellington has advised that J. B. MacEwan and Co., Ltd., P.O. Box 458, 139, Featherston Street, Wellington, C.1., desire to contact United Kingdom manufacturers of salt grinding machines with a view to marketing this equipment in New Zealand.

The enquirers are particularly interested in grinders with a minimum capacity of 112 lb. per hour and approximately 200 mesh suitable for use in butter and cheese factories. The machines should be of modern design and all the parts which come into contact with the salt should be of stainless steel or other non-corrosive metal.

United Kingdom manufacturers who desire to obtain representation in New Zealand for this type of equipment are invited to communicate direct with the company, supplying full details, including prices, delivery dates, and any available literature of the machines they have to offer.

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Compressors and Electric Motors

The British Consulate at Washington has been approached by the Sweden Freezer Manufacturing Co., 3401, 17th Avenue West, Seattle, 99, Washington, who desire to be put into touch with United Kingdom manufacturers of refrigeration compressors suitable for Freon 12, and high starting torque, single phase, 220 volt, 60 cycle condenser start induction motors or repulsion induction type electric motors of a capacity ranging from ½ h.p. to 2 h.p.

United Kingdom manufacturers who are interested in this enquiry should communicate with the Seattle firm direct at the address given above.

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Chocolate-making Machinery

The United Kingdom Trade Commissioner at Bombay has advised that Ahmed A. Fazelbhoy, Ltd., Liberty House, 41/42, Marine Lines, Bombay, 1, desire to purchase some small chocolate-making plant.

The company requires machinery capable of producing up to 5 tons of chocolate covering and up to 3,000 lb. of slab chocolate per month working only one shift daily. The company may also be interested in small machines for producing other types of chocolate and in small wrapping machines.

Interested United Kingdom manufacturers are invited to communicate direct with Mr. A. A. Fazelboy, c/o Ahmed A. Fazelbhoy, Ltd., at the address given above, furnishing full details, including prices, delivery dates, together with available literature of the plant they have to offer.

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Canned Brisling

The British Consulate-General at New York have reported that The Duane Import and Export Corporation of 233, Broadway, New York, 7, have expressed interest in receiving quotations from the United Kingdom for canned brisling. They appear likely to place orders if prices, quantities available, and delivery dates meet with their requirements.

Any firms interested in this enquiry should communicate with the Corporation direct, quoting prices c.i.f. New York (preferably in U.S. currency).

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Canned Fish, Fruit, and Nuts

H.M. Consul-General at New York has advised that Mitchel Beck Company Inc., 105, Hudson Street, New York, 13, N.Y., are interested in obtaining the agencies of U.K. firms for canned tuna and other canned fish, dried fruits, nuts, and dates.

Firms interested in this enquiry should communicate with Mitchel Beck Company Inc. direct.

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Cold Storage Plant

The First Secretary (Commercial) to H.M. Embassy, Bangkok, reports that the Department of Fisheries, Government of Thailand, Bangkok, wishes to contact United Kingdom manufacturers of cold storage plant and ice-making machinery.

It is understood that the Department of Fisheries plans to build in Bangkok a cold store with a capacity of 1,000/1,500 tons of fresh fish and other foodstuffs, and an ice factory capable of producing 120 tons of ice per day. The cold store will probably be divided into units of 500 tons capacity, each complete with quick freezing apparatus.

Interested United Kingdom firms are invited to communicate with the Department of Fisheries either direct or (preferably) through local agents, submitting literature describing their products, prices, delivery, and shipment particulars, an indication of the technical supervision they could provide for the erection of the machinery, and any other information they feel would be useful.

Interested firms not already represented in Thailand are reminded that the Counsellor (Commercial) of the Commercial Relations and Exports Department of the Board of Trade is ready to assist them in obtaining suitable agents there.

Cassava Processing

A new factory for processing cassava in British Guiana is expected to be ready for operation at the beginning of 1951, and farmers are being asked to increase their production of this root crop.

One of the most important of the factory's operations will be the manufacture of cassava flour, thus reducing British Guiana's dependence on wheaten flour, which is at present imported from hard currency areas.

The production of cassava starch is also being considered, and in the near future it is proposed to establish in the Pomeroon and North West district machinery for processing cassava roots into meal for shipment to Georgetown.

Cocoa and Chocolate Congress

Some 250 delegates from 27 countries participated in the Third International Congress of Cocoa and Chocolate Manufacturers held in Lausanne, Switzerland, from Sepber 18 to 24. The great part of the work of the 11 commissions of the Congress was devoted to technical problems, such as the re-definition of cocoa and chocolate and standardisation of analytical methods. Among recommendations put forward was one for the largest possible collection and circulation of statistics on production, sales, and exports, with all manufacturers urged to form national associations for the purpose of international co-operation through the International Cocoa and Chocolate Bureau in Brussels.

Another resolution recorded the delegates' opposition "to all supplies at abnormal prices resulting from subsidies, direct or indirect, aimed at favouring exports in an abnormal manner."

Delegates also urged Governments levying heavy duties or taxes on chocolate and cocoa powder to lift such taxes as a contribution to lowering the cost of living and increasing the purchasing power of wages.

News from the Ministries

Imported Dates

Dates have now been added to the list of commodities which may be imported under open general licence. The licence will apply to imports from and originating in any country other than those excluded in Notice to Importers No. 886 issued by the Board of Trade on July 14, 1950.

Resignation

Sir Henry Turner, who was appointed Director of Livestock and Home Produced Meat at the Ministry of Food in February, 1940, and who subsequently became Controller of Meat and Livestock, is to be released from his appointment at the end of October, in order that he may return to the service of the New Zealand Refrigerating Company. He has, however, expressed his willingness to continue to render any assistance possible in an advisory capacity.

Mr. R. Herbert, C.M.G., will act as Under-Secretary in charge of the Meat and Livestock Division of the Ministry, following upon Sir Henry Turner's retirement.

White Fish Authority

In accordance with the statement made by the Prime Minister in the House of Commons on July 4 last, the Government have appointed the following persons to act as members designate of the White Fish Authority for the establishment of which legislative sanction will be asked in the new session of Parliament: Admiral Sir Robert Lindsay Burnett, G.B.E., K.C.B., D.S.O., LL.D., to be chairman designate; Mr. William Yeaman to be vice-chairman designate; Mr. Peter Douglas Hay Dunn, C.M.G., O.B.E., A.C.I.S.; Mr. Charles James Knight; and Mr. George Cedric Wilson, O.B.E.

The vice-chairman of the Authority will act as chairman of a Committee which it is hoped will exercise in respect of Scotland functions which have been delegated to it by the Authority. The other members designate of that Committee will be: Captain John Steele Allan, D.L., F.R.I.C.; Mr. Alan Howieson Brewster Grant; Mr. John Sullivan; and Mr. Robert Drysdal Winton, C.A.

The Government have decided to promote legislation to set up the White Fish Authority with adequate powers to regulate, reorganise, and develop the white fish industry. Consideration is being given to the detailed powers which the Authority will need if effective measures are to be taken to make the industry pay its way; but in the meantime, as there is much preliminary work to be done involving consultation with all sections of the industry, it has been decided to appoint the members of the Authority in advance of legislation so that they may begin the preparatory work.

For the present the members of the proposed Authority will operate from Devonshire House, Piccadilly, London, W.1, and York Buildings, Queen Street, Edinburgh; communications intended for consideration by the Authority should be sent to one or other of these addresses.

Mr. Knight and the members of the Scottish Committee other than Mr. Yeaman have been appointed on a part-time basis.

Christmas Cakes

An Order permitting the sale of iced and decorated Christmas cakes of a prescribed quality at a price not exceeding 3s. 9d. per lb. has been made. The Order follows the same general lines as the Order of last year, except that the cost of the decorative wrapping may now be included and the restrictions on the weight of cakes have been removed.

The Order operates from November 26 until December 30, 1950.

Petroleum Prices Increased

Consequent upon recent increases in world prices, the maximum bulk prices for certain petroleum products have been reviewed, and as from October 10, 1950, the following maximum prices will operate in the U.K.:

	Inner Zone	*Outer Zone*	*General Zone*
Diesel oil for road vehicles	2s. 7d.	2s. 7½d.	2s. 7½d.
Gas oil	1s. 0½d.	1s. 0½d.	1s. 0½d.

The oil distribution companies are free to sell below the Ministry's maximum prices, and any increases in the actual selling prices will be the subject of separate announcements by the committee.

Raw Cocoa

The buying of raw cocoa on Government account is to be ended. From a date to be decided the cocoa and chocolate confectionery industry will resume buying raw cocoa through ordinary trade channels.

The rationing of chocolate confectionery and the existing controls over the prices of chocolate confectionery and other cocoa products will continue.

Tuberculosis Eradication Plan

On October 1, 1950, the final stage in the campaign against bovine tuberculosis began. The plan is to eradicate the disease entirely from areas and gradually to extend the areas to cover the whole of Great Britain. Similar methods have been adopted successfully by other countries.

On that date the revised Attested Herds Scheme came into operation, providing bonuses for owners of attested herds, and free testing started in two areas in S.W. Scotland and S.W. Wales. The Minister of Agriculture and Fisheries is giving notice of the intention to declare parts of these areas eradication areas in 1952.

Sugar for Bees

Because of the danger to bee colonies caused by prolonged bad weather, an additional quantity of sugar not exceeding 5 lb. per colony will be made available to beekeepers to supplement the allowances for winter and spring feeding already announced.

Beekeepers may draw the additional 5 lb. of sugar per colony either before January 31, 1951, as an addition to the winter allowance or during the period February 1 to June 30, 1951, as an addition to the spring allowance, but those beekeepers who have already elected to draw their spring allowance at the same time as the winter allowance may draw the present supplement of 5 lb. only during the spring period, February 1 to June 30, 1951.

Applications for permits should be made on the official application form obtainable at local food offices. The completed form should be countersigned by a responsible person and returned by the applicant to the food office.

Imports of Fruit Pulp

As from September 20, 1950, fruit pulp and bulk frozen fruit without added sugar may be imported from Czechoslovakia under the block licensing arrangements previously announced.

The necessary arrangements have been made with H.M. Customs and Excise. Importers who already hold an appropriate licence of the F.P. Series will be allowed to import these items from Czechoslovakia without amendment to their licences.

Importers who are not already in possession of the appropriate licence but who wish to share in these arrangements should submit an application (in duplicate) on Board of Trade form ILD/A, which may be obtained from the Board of Trade, Import Licensing Branch, Romney House, Tufton Street, London, S.W.1., from the usual Customs Offices, or from the Ministry of Food, Fresh Fruit and Vegetables Division, Import Section, 24-32, York Terrace, Regent's Park, London, N.W.1. For administrative convenience, importers are asked to send such applications to the Board of Trade through the Ministry of Food at the above address.

U.K./Brazilian Trade Agreement

Notes have been exchanged between the Governments of U.K. and Brazil establishing trade schedules for the year ending June 30, 1951.

The two Governments undertake, subject to agreement on price and quality and in accordance with the basic principle of reasonable equilibrium in sterling payments, to authorise the exportation and importation of goods listed in the schedules. The Exchange of Notes makes provision for United Kingdom exports to Brazil during the year ending June 30, 1951, to the value of £83,160,000 f.o.b., together with sales of oil, petroleum, and petroleum products by British controlled oil companies to the value of £11,460,000 f.o.b., and for imports from Brazil of £51,440,000 f.o.b.

Payments will be in sterling in accordance with the payments provisions of the Trade and Payments Agreement 1948 (Cmd. 7488), and the general principle of a reasonable degree of equilibrium in sterling payments which include transactions with the rest of the sterling area and invisibles is reaffirmed.

The proposed imports from Brazil include hides, cocoa, coffee, rice, meat, oranges, and Brazil nuts. The schedule of exports from the United Kingdom includes coal, iron and steel manufactures, non-ferrous metal manufactures, chemicals, machinery, vehicles, and other consumer goods.

The Exchange of Notes and the accompanying trade schedules are being published as a White Paper.

Fertilisers and Feedingstuffs Committee

After consultation with the interests concerned, the Minister of Agriculture and Fisheries and the Secretary of State for Scotland have appointed a reconstituted Advisory Committee under the chairmanship of Sir Edmund Bacon, Bt., O.B.E., T.D., for the purpose of assisting and advising them with respect to the making of regulations under the Fertilisers and Feedingstuffs Act, 1926.

The composition of the Committee is as follows:

Sir Edmund Bacon, Bt., O.B.E., T.D. (chairman); Mr. H. H. Bagnall, B.Sc., F.R.I.C.; Mr. D. J. Bird, M.B.E.; Mr. E. H. I. Brown; Mr. C. C. J. Bullough; Mr. A. M. Cameron, B.Sc., F.R.I.C.; Dr. C. Crowther, M.A., Ph.D.; Dr. E. M. Crowther, D.Sc., F.R.I.C.; Mr. J. K. D. Dow, B.Sc., M.R.C.V.S.; Dr. G. Matthew Fyfe, M.D., Ch.B., D.P.H., F.R.C.P.; Mr. C. W. Higgs; Mr J. M. Howie; Mr. E. P. Hudson; Mr. A. M. Hutcheson; Dr. D. N. McArthur, D.Sc., Ph.D., F.R.I.C.; Dr. J. Manning, B.Sc., Ph.D., A.R.I.C.; Mr. E. C. Mercer; Mr. C. Nevile; Mr. C. Norman; Mr. J. Ure Primrose, D.L., J.P.; Mr. F. F. Roberts, O.B.E.; Mr. A. R. Semple; Mr. E. B. Stevenson; Mr. G. Taylor, O.B.E., F.R.I.C.; Mr. Eric Voelcker, A.R.C.S., F.R.I.C.; Mr. G. T. Williams; Mr. F. L. Winter.

Government Departments will be represented as follows:

Ministry of Agriculture and Fisheries: Mr. B. W. Phillips, O.B.E.

Department of Agriculture for Scotland: Mr. G. Page.

Ministry of Agriculture for Northern Ireland: Dr. J. Houston, D.Sc.

Department of the Government Chemist: Dr. J. R. Nicholls, D.Sc., F.R.I.C.

Ministry of Food: Mr. H. R. Humphries, O.B.E.

Communications for the Committee should be addressed to the secretary, Mr. C. H. Dee, Ministry of Agriculture and Fisheries, 14-21, Chester Terrace, Regent's Park, London, N.W.1.

Liberalisation of Trade

In accordance with Britain's obligations under O.E.E.C. and following the signature of the European Payments Union Agreement, the various "liberalisation" import concessions will now be extended to Western Germany. These concessions permit the import without individual licence of a wide range of goods from most O.E.E.C. and many other soft-currency countries.

Import Licensing Regulations

With effect as from September 21, 1950, amendments have been made to the open general licences which permit the import of goods from all countries, the import of particular goods from stated countries, and the open general licences issued in connexion with the policy for the liberalisation of trade which was announced in Notice to Importers No. 336.

A consolidated Notice to Importers containing information as to the regulations relating to the import of goods which, as at September 21, 1950, were subject to open general licences has now been issued. This consolidated Notice, which supersedes the one published in June, 1948 (Notice to Importers No. 292), embodies the new amendments and also contains minor changes such as the deletion of goods covered by omnibus items.

Herring Industry Board

The Secretary of State for Scotland, the Minister of Agriculture and Fisheries, and the Secretary of State for the Home Department have, in terms of Section 1 of the Herring Industry Act, 1938, appointed Mr. George Cedric Wilson, O.B.E., in succession to Mr. H. A. Edwards, F.C.A., as a member of the Board until March 31, 1953. The appointment is on a part-time basis.

Mr. Wilson was formerly a partner in the firm of H. Wilson and Sons, wholesale fish merchants and a director of the Grimsby Fish Merchants' Association, of which he was chairman for some years. He now has no financial interest in the fishing industry. Mr. Wilson is Honorary Trade Adviser to the Fish Division of the Ministry of Food, an Alderman of Grimsby Town Council, and chairman of Grimsby Corporation Finance Committee.

The other members of the Herring Industry Board are Sir Frederick A. Bell, O.B.E. (chairman), and Sir T. George Wilson.

Meat Products from W. Germany

In amplification of the announcement made by the Board of Trade that certain open general licences under the Import of Goods (Control) Order, including open general licences for certain meat products and canned ham and bacon (gammons and shoulders only) had been extended to goods from Western Germany, importers should note that such products are subject to the provisions of the Public Health (Imported Food) Regulations.

These Regulations provide that meat products, including canned ham and bacon, may be imported for sale in the United Kingdom only when they are covered by an official certificate. At present no official certificate has been recognised for these imports from Western Germany, although the question is under examination.

Import of Biscuits

Biscuits may now be imported from Austria, Belgium, Czechoslovakia, Denmark, France, Holland, the Irish Republic, Italy, Norway, and Sweden under block licences granted to individual traders instead of under specific licences.

The block licences will allow the importation of unrestricted quantities of biscuits from the sources indicated during the period of validity of the licences, provided that the national expenditure on imports from each source remains within the currency allowance authorised. In view of this proviso, it may be necessary to discontinue or suspend without warning further imports from any of these sources.

Applications for block licences will now be considered from any *bona fide* importer, subject to the applicant undertaking to comply with certain conditions. For administrative convenience, applications should be submitted (in duplicate) to the Import Licensing Branch of the Board of Trade, through the Ministry of Food, Bakery Division, London Road, Stanmore, Middlesex. Copies of the appropriate application form ILD/A may be obtained from the Board of Trade, Import Licensing Branch, Romney House, Tufton Street, London, S.W.1., or the usual Customs Offices.

Traders are reminded that the grant of a block licence does not relieve them from complying with the regulations governing the price control, labelling, and wholesaling of biscuits.

Approved Cleansing Agents

In the September, 1950, issue of FOOD MANUFACTURE, attention was drawn to the approval, under the Milk and Dairies Regulations, 1949, of the use of certain sodium hypochlorite solutions for the cleansing of dairy utensils.

Two further products, Clorfect (Synsap, Ltd.) and Univpuri Chlorsol (Universal Purifiers, Ltd.), have now been approved by the Minister of Agriculture and Fisheries and the Minister of Food.

Rice and Rice Products

The Rice Order, 1950, which came into force on October 8, 1950, and replaces with amendments the Rice (Control and Maximum Prices) Order, 1943, as amended, has been made.

The maximum prices of whole rice are increased at all stages of distribution, so as to enable the Ministry to buy the better qualities of rice which are not needed by the rice-eating peoples of Asia for their own consumption.

Ground rice and rice flour may be sold by retail at 9d. a lb.; it will, however, be several weeks before supplies reach consumers as the raw materials are only now being made available to the manufacturers.

The present maximum prices of ground rice and rice flour at stages of distribution other than retail are increased.

The manufacture and sale of granulated rice, flaked rice, and rice cones are now permitted and maximum prices are prescribed at all stages of distribution.

Additional charges at a maximum rate of 2d. a lb. (3d. a lb. for flaked rice) may be made for prepacking rice or rice products.

The restrictions on the use of rice and rice products for certain manufacturing purposes (including pudding mixtures, custard powders, and meat and bakery products) are removed. Broken rice, however, may still only be bought from, or sold to, the Ministry. Manufacturers wishing to obtain supplies of rice or rice products should get into touch with their former suppliers who will be able to provide information about the quantities likely to become available.

World supplies of rice are still insufficient to satisfy demand, and British imports will continue to be on a limited scale. The Ministry of Food will remain the sole importer of rice.

Imports of Apples

With effect from January 1 next, apples will be added to the list of imports permitted under open general licence. The licence will apply to imports consigned from, and originating in, any country or territory other than those excluded in Notice to Importers No. 401 issued by the Board of Trade on September 15, 1950, as amended.

The Minister of Food will cease to trade in those apples which are to be put on open general licence, but any purchases which may be made from North America will still be made by the Minister of Food.

As soon as the necessary arrangements can be made, the controls over the price and distribution of imported apples will be removed. These controls will not be reimposed provided prices remain at reasonable levels according to the season. Price control of home-produced apples has already been removed.

Agreement has been reached on the purchase of a quantity of apples from British Columbia. Some of these supplies may arrive in time for the Christmas trade.

Future Prices for Farm Produce

Part I of the Agriculture Act, 1947, requires Ministers to determine this year not only actual prices for milk, fatstock, and eggs for the period April 1950 to March 1951, but also minimum prices for these commodities for the years 1952/53 and 1953/54. As was stated when the actual prices for 1950/51 were announced on March 23 last, consideration of the future minimum prices was deferred by agreement with the Farmers' Unions.

The Agricultural Ministers now announce that, after discussion with the National Farmers' Unions of England and Wales, Scotland, and Northern Ireland, they have fixed guaranteed minimum prices for the years 1952/53 and 1953/54 as follows:

Commodity	*Year (Apr. to Mar.)* 1952-53	1953-54
	s. d.	s. d.
Milk per gallon	2 0	1 10
Fat cattle per live cwt. ...	95 0	95 0
Fat sheep per lb.	1 10	1 10
Fat pigs per score ...	40 0*	40 0*
Eggs per dozen	3 0*	2 11*

* Subject to a reduction of 6 per cent. for fat pigs and 5 per cent. for eggs for each 10 per cent. fall in feedingstuffs prices below the current level.

Information and Advice

Moulds for Orange and Lemon Slices

B.4555. *Could you let us have some information regarding moulds, half-cylindrical in shape, used in the production of orange and lemon slices?* (Kent.)

The moulds required for the orange and lemon slices which are used chiefly for cake decoration are very simple and easily made by the works carpenter. A hard, polished wood is all that is necessary. The half-round mould is made, to predetermined size of radius, to fit comfortably the width of an ordinary starch tray. If the normal starch tray is too shallow for the size required, then the sides of the trays are made deeper with battens.

The half-round jelly piece is cast in this impression, and allowed to set. The " pith " consists of a lightly beaten mallow which has been spread thinly in greased trays. When set, this sheet is carefully extracted from the tray, and laid over the moistened core, the piece being trimmed to fit the core. Finally, a portion of the original batch, which has also been thinly poured in greased trays and allowed to set, is laid over the moistened " pith " and cut to fit. The result is a half-round block of jelly centre, " pith," and " rind "; this is laid in granulated or coarse castor sugar as required, allowed to dry out, and then cut into slices on the guillotine.

Coating Dates

B.4642. *We are intending to make an article comprising dates coated with chocolate vermicelli, desiccated coconut, and " hundreds and thousands." Could you please inform us what method we can use to make the above adhere to the dates and dry quickly, and whether this would require a Ministry of Food licence?* (Dorset.)

The dates may be coated with a syrup consisting of 16 lb. of fondant dissolved in 1 gallon of water. This will dry in 24 to 36 hours if kept in a dry room at normal temperature. Hot air will cause the oil to exude from the coconut.

A Ministry of Food licence would certainly be required under the new Order.

Golden Crunch Biscuits

B.4686. *Could you let us have a recipe for Golden Crunch biscuits?* (Lanark.)

The only type of biscuit which answers to the name of Golden Crunch is that sometimes known as Krunch or Flapjack, and the following recipe is given as a basis for trial:

	lb.
Butter	2
Cooking fat	1
Sugar	2
Golden Syrup	1
Rolled oats	4

The butter, fat, sugar, and syrup are heated together in a pan over a low gas flame until melted, then the rolled oats are thoroughly mixed in. The mixture is spread out level on a clean, greased baking sheet, with a support at the open end to keep the mixture from flowing during baking. The mixture is baked for about 20 minutes in a cool oven at 360° F.

When cooked, it is cut up into finger-shaped biscuits or small squares before it is cold.

Information Supplied

The Enquiry Service has dealt with requests for the names of manufacturers and suppliers of plant, machinery, and materials, and also general information as follows:

B.4620. *Popcorn.* (Herts.)
B.4621. *Positive infinitely variable speed gears.* (Mont.)
B.4622. *Dessert powders.* (S. Rhodesia.)
B.4623. *Shelled nuts and Cellophane bags.* (Warwicks.)
B.4624. *Cake fillings and Savoy bags.* (Yorks.)
B.4628. *Prepared mustard and French mustard.* (Jerusalem.)
B.4629. *Fluorescent fittings.* (Australia.)
B.4630. *Process cheese.* (N. Ireland.)
B.4631. *Pressure gauge for ascertaining the pressure inside processed cans.* (London.)
B.4632. *Labels for cans and literature on food manufacture.* (London.)
B.4633. *Cellophane bags for nuts.* (Yorks.)
B.4635. *Nut shelling machinery.* (Yorks.)
B.4636. *Tomato soup.* (Bucks.)
B.4638. *Slab and crystal jellies.* (Northumberland.)
B.4639. *Glass jars and caps.* (Lancs.)
B.4640. *Molasses.* (London.)
B.4641. *Potato straws.* (Yorks.)
B.4643. *Butchers' stainless steel and plastic trays.* (Lancs.)
B.4644. *Waxed paper for salt twists.* (Warwicks.)
B.4645. *Machinery for macaroni.* (Warwicks.)
B.4648. *Printing of Cellophane wrappers.* (London.)
B.4651. *Dulcin.* (Kent.)
B.4652. *Tomato juice cocktails.* (Channel Isles.)
B.4653. *Magnetic separator for powdered milk and rice.* (Ireland.)
B.4655. *Mashed potato powder.* (Kent.)
B.4656. *Potato crisps.* (London.)
B.4657. *Welfare and hygiene pamphlets.* (Berks.)
B.4667. *Fruit pulp importers and jam manufacturers.* (Chile.)
B.4669. *Lemon curd.* (London.)
B.4670. *Non-extracted dried brewers' yeast.* (Belgium.)
B.4672. *Chewing gum.* (London.)
B.4673. *Orange base.* (Kent.)
B.4674. *Cubing machines for meat.* (Yorks.)
B.4675. *Stoving lacquers.* (Italy.)
B.4676. *Cashew nut cracking machinery.* (London.)
B.4677. *Small fat press.* (London.)

Information Required

B.4701. *Manufacturers of a machine suitable for moulding fish cakes with an output of up to two to three thousand per hour.* (Lancs.)

B.4715. *Name and address of manufacturers of machinery for the production of " gari "—a native food in West Africa—from cassava roots.* (London.)

Recent Patents

642,475. Industrial Patents Corporation: Refrigerator car.
642,530. Salfisberg, L. L.: Manufacture of packages.
642,544. Hudson, G. R., and Evans, A.: Machines for sealing canisters or the like with adhesive tape.
642,653. Marshall's Food Products, Ltd., and Rutter, L. F.: Manufacture of rennet and rennet preparations.
642,688. Palik, F.: Preserving or treatment of fruit or fruit pulp or of vegetables or animal products with sugar, salt, or the like.
642,732. American Cyanamid Co.: Packages for use in liquid purification.
642,776. Giles, A. C.: Clamping ring closures for the lids of drums, kegs, and like containers.
642,779. Cotter, P. R.: Crates or like containers for bottles and like articles.
642,787. Fisadco, Ltd., and Freeman, P.: Fish-dressing machines.
642,809. Best Products, Ltd., and Best, F. L.: Apparatus for heating liquids.
642,814. Fullers, Ltd., and Beck, A. H.: Collapsible cardboard boxes and containers.
642,823. Aktiebolaget Briggeri-Maskener: Counter pressure bottle filling machines.
642,857. Aero Pipe and Glass Co., Ltd., and Julius, W. O.: Refrigerating apparatus.
642,858. Gillott Electro Steam Cookers, Ltd., and Barton, A. V.: Electrically heated tanks for heating and melting substances.
642,897. Arenco Aktiebolag: Fish-dressing machines.
642,924. Collins, A. F.: Refrigerating apparatus.
642,988. Molins Machine Co., Ltd., and Jackson, D. R. P.: Boxes or cartons of cardboard or other like material.
642,998. Robinson, Ltd., E. S. and A., Robinson, P. N., and Fry, R. J.: Cardboard and like boxes, cartons and the like.

Abstract of a Recent Specification

Machines for Skinning Fish

This invention relates to improvements in machines for skinning fish and is concerned with machines in which the fish is laid in the form of fillets with its skin side upon the circumference of a rotary drum, the tail end of the fish being impaled upon prongs or needles located within the periphery of and carried round with the drum to carry the fish against a skinning knife, after which the prongs or needles are withdrawn to release the fish skin.

It has previously been proposed to mount the needles in a block carried by a carrier member pivotally mounted within the drum, the said member being spring-controlled to press the needles through needle apertures in a depression in the surface of the drum, and the needles being withdrawn by the co-operation of the said member with a fixed cam. The impaling of the fish on the needles is effected by means of a cam-operated presser.

Such machines are unsatisfactory in operation, because, when the presser comes into operation, the needles are held in their projected position only by spring pressure, with the result that the needle carrier frequently yields or the needles become damaged or break, necessitating complete stoppage of the machine. Moreover, the needles were previously welded or brazed into a supporting block, so that in the event of the needles becoming bent, twisted, or broken, it was necessary to remove the needle block for repairs.

The present invention overcomes these disadvantages and the machine is provided with means for positively holding the needle carrier against yielding movement during the operation of the presser, thus ensuring that the fish will be impaled upon the needles. This is preferably effected by the provision of a fixed track with which the needle carrier co-acts when the drum reaches the position in which the presser comes into operation, so that the needle carrier is positively held against retrogression under the impact of the presser.

Moreover, it is preferred to employ needles which are in the form of headed nails, the heads of which are square or rectangular and are fitted side by side in a groove or recess in an apertured needle block through which the shanks of the needles project, the heads of the needles being locked in the said groove or recess by means of a backing plate or locking member detachably secured to the grooved or recessed needle block. This construction facilitates removal of bent, damaged, or broken needles and their renewal, since each needle is separately fitted in position.

Any adhering fish skin is scraped from the surface of the drum, after the tail has been released by retracting the needles, and for this purpose a scraping roller is provided which extends transversely across the face of the drum in rear of the position at which the needles are retracted. This scraping roller is preferably formed with a plurality of annular grooves and intervening rings of teeth between the grooves. A clearing comb preferably co-operates with the grooves in the roller to clear the knife of any adhering skin.

The knife is protected by a knife guard or screen to prevent injury to the operator, this guard being removable only when the drum is stationary.
638,852. *Harold Stanley Rowton.*

Recent patents have been selected from the "Official Journal of Patents" and are published by permission of the Controller of H.M.S.O.

Trade Marks

MARTINEAUS.—668,702. Refined sugar, brewing sugar, and syrup (for food). **Martineau's, Limited,** Tower Hill Station Buildings, Byward Street, London, E.C.3; Sugar Refiners.
PAYTHORN.—669,563. Tinned fish; preserved, dried, and cooked fruit and vegetables; and jellies (for food), jams, tinned milk, edible oils, edible fats, pickles, and soups. **John Arthur Schofield,** trading as **J. E. Schofield and Son,** Britannia Warehouse, Ormond Street, Bury, County of Lancaster; Wholesale Grocers and Provision Merchants.
HOST.—682,745. Pickles. **Holbrooks, Limited,** 203, Ashted Row, Birmingham; Cheapside, Stourport, Worcestershire; and 68, Fenchurch Street, London, E.C.3; Sauce and Pickle Manufacturers.

Trade marks have been selected from the "Official Trade Marks Journal" and are published by permission of the Controller of H.M.S.O.

New Companies

Health Food Stores (Reigate), Limited. (483938.) 5, West Street, Reigate, Surrey. Nom. cap.: £5,000 in £1 shares (1,000 cum. red. pref.). Dirs.: J. H. Spalding, 5, West Street, Reigate, Surrey; S. Peck, Suntrap, The Close, Fairlight, Hastings; T. Crawford, High Pines, Waterlow Road, Reigate.

Bromwich (Four Oaks), Limited. (484035.) 5, Mere Green Road, Four Oaks, Warwicks. To carry on business of bakers, confectioners, grocers, etc. Nom. cap.: £10,000 in £1 shares (2,500 red. cum. pref.). Permt. gov. dir.: Dorothy B. Burrows, 5, Mere Green Road, Four Oaks, Warwicks.

Wilson's (Blackpool), Limited. (484064.) 475, Waterloo Road, Blackpool. To carry on business of manufacturers of and dealers in confectionery, etc. Nom. cap.: £2,000 in £1 shares. Dirs.: E. W. Bonfield (mang. dir.), 475, Waterloo Road, Blackpool; Mrs. M. E. Bonfield and C. H. Bonfield, 45, Preston New Road, Blackpool.

Larkfield Storage Company, Limited. (484084.) Melbourne House, Walton Road, Wisbech. To carry on business of proprietors of gas and cold storage accommodation for all purposes; dealers in fruit, meat, fish, and other perishable foodstuffs, etc. Nom. cap.: £2,000 in £1 shares. Dirs.: W. H. Dorsett, Melbourne House, Walton Road, Wisbech (permt.); G. L. Johnson, 9, Sandringham Avenue, Wisbech.

Arlington Crisps, Limited. (484113.) 6, Spring Street, Spring Bank, Hull. To take over business of manufacturers of potato crisps carried on as "Arlington Crisps" at Hull. Nom. cap.: £2,000 in £1 shares. Permt. dirs.: H. Dixon, Fourways, 29, West Ella Road, Kirk Ella, E. Yorks.; A. Wilson, 45, Ampleforth Grove, Willerby Road, Hull.

Goodacre and Everard, Limited. (485902.) 1, King John's Chambers, Bridlesmith Gate, Nottingham. To take over the business of a flour miller and provender merchant carried on as "Alan Moorhouse" at Loughborough. Nom. cap.: £2,000 in £1 shares. Dirs.: A. Moorhouse, Lower Mill, Loughborough, Leics.; J. Moorhouse, 279, Buxton Road, Macclesfield.

John Emblem (Thetford), Limited. (485912.) 69, London Street, Norwich. To carry on the business of manufacturers and producers of potato crisps, fish cakes, and nuts, etc. Nom. cap.: £5,000 in £1 shares. Permt. dirs.: J. Emblem, 189, Westgate Road, Bury St. Edmunds; J. N. Trett, Anchor Hotel, Thetford.

Gustard Wood Nurseries, Limited. (485934.) Bleak House, Gustard Wood, Wheathampstead, Herts. To take over the business of cucumber and tomato grower carried on at Wheathampstead by Louisa Wright. Nom. cap.: £4,000 in £1 shares. Dirs.: Louisa Wright and Margaret C. Wright, Bleak House, Gustard Wood, Wheathampstead, Herts.

Hughleys, Limited. (485972.) 76, New Street, Birmingham. To carry on the business of bakers, confectioners, etc. Nom. cap.: £1,000 in £1 shares. Dirs.: G. E. Hill, 9, Springfield Court, Stratford Road, Hall Green, Birmingham, 28; E. A. Heath, Sunnydale, Gunners Lane, Rubery, near Birmingham.

Taken from the Daily Register, compiled by Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C.2.